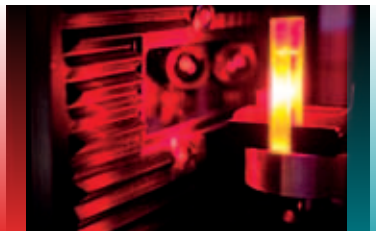
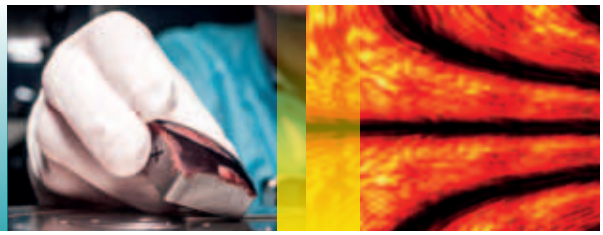
ANNUAL REPORT AND STATEMENT OF INCOME FOR 2011

DANISH FUNDAMENTAL METROLOGY





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DFM's scientific research results in new knowledge, measurement techniques and standards, which support the need for accurate measurements required by Danish Industry and Authorities.

The services offered are high-level calibrations and reference materials traceable to national primary or reference standards, courses related to metrology and consultancy services.

DFM has a special role in developing measurement capabilities needed by small and medium sized high-tech companies in order for them to evolve and prosper.

DFM works to ensure global confidence in Danish metrological services, which is critical for competing in the global market place.

Annual report 2011 edited by
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LEDELSENS BERETNING 2011

DFM har i 2011 fortsat de seneste års positive udvikling med stigende omsætning og forbedret årsresultat.

Årets samlede omsætning blev 20,1 mio. kr mod 19,2 mio. kr i 2010, og det samlede resultat blev 1,0 mio. kr mod 0,6 mio. kr i 2010. Ledelsen vurderer, at både omsætning og resultat er tilfredsstillende.

Danske virksomheder møder stigende metrologikrav for at kunne sælge produkter og ydelser på de internationale markeder. Mange danske højteknologiske virksomheder har ikke selv de nødvendige metrologikompetencer, og derfor er det vigtigt, at DFM kan bidrage effektivt til at løse disse udfordringer. DFM målretter udviklingen af nye metrologikompetencer mod de områder, som samfundet har mest brug for.

Deltagelse i forsknings- og udviklingsprojekter, kommerciel kontraktforskning samt udvikling af nye metrologiydelser er effektive måder til at styrke udnyttelsen af DFM's specialiserede metrologikompetencer i erhvervslivet og samfundet.

Det er derfor glædeligt, at DFM igen i 2011 har opnået et stigende antal forsknings- og udviklingsprojekter, hvilket har været et mål i indeværende strategiperiode. DFM har i 2011 indleveret i alt 14 projektansøgninger, og der er opnået tilsagn om deltagelse i otte nye projekter.

Samtidig har DFM kunnet igangsætte nye aktiviteter, som har til formål at synliggøre selskabets metrologikompetencer over for danske højteknologiske SMV'er og at bidrage til løsning af de udfordringer, som SMV'erne står med det i daglige. Et af resultaterne har været igangsættelse af fem nye videnkuponer sammen med danske højteknologiske SMV'er.

Der er igen i 2011 udviklet en række nye metrologiydelser, og indsatsen for at udvikle nye kommercielle ydelser styrkes yderligere i 2012. Det kommercielle salg er i 2011 steget fra 2,2 mio. kr til 2,7 mio. kr, primært drevet af en stigning i kommercielle kontraktforskningsopgaver og nye myndighedsopgaver.

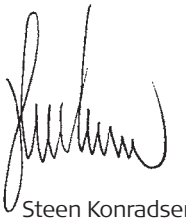
Fundamental metrologi udgør grundlaget for international standardisering, international accept af akkrediteringer og kvalificering af ny teknologi. Forskning og innovation er centrale elementer i Europa-Kommissionens strategi, og der peges i initiativet "Innovation Union" blandt andet på standardisering som et vigtigt værktøj til at fremme innovation og implementering af ny teknologi. Kommissionen arbejder derfor på at styrke metrologiindsatsen gennem etablering af "European Metrology Programme for Innovation and Research" i ottende rammeprogram.

DFM har som Danmarks Nationale Metrologiinstitut en særlig forpligtelse til at udføre forskningsaktiviteter indenfor den fundamentale metrologi på et højt internationalt niveau, og DFM har et mål om at være blandt de førende i verden indenfor de udvalgte nicheområder, hvor instituttet er aktivt. Det er derfor tilfredsstillende, at der i 2011 er ansat endnu en forsker indenfor nanometrologi og fotonik ved DFM, således at antallet af fuldtidsforskningsstillinger ved årets udgang var 14 mod 13 ved udgangen af 2010.

Styrelsen for Forskning og Innovation har på vegne af Rådet for Teknologi og Innovation i 2011 forestået en ekstern evaluering af GTS institutterne. I rapporten, der omhandler evalueringen af DFM, er blandt andet følgende konklusioner fremlagt:

- DFM udgør en kritisk infrastruktur, der bidrager væsentligt til dansk industri og erhvervsliv ved at tilbyde sporbarhed på højeste internationale niveau og varetage Danmarks internationale forpligtelser på det metrologiske område
- DFM's roller, dels som det Nationale Metrologiinstitut, dels som GTS institut, supplerer hinanden godt og balanceres fornuftigt i det daglige
- DFM er begavet med dybt engagerede medarbejdere og ledere, der brænder for deres faglige områder
- DFM har gennem tilknytningen til DTU fundet en naturlig ejermæssig og faglig tilknytning, hvor der opstår betydelige synergieffekter mellem ejer og datterselskab
- Instituttet er inde i en positiv udvikling, hvor der arbejdes ihærdigt og overbevisende med at sikre et økonomisk bæredygtigt fundament for yderligere vækst
- DFM skal have fokus på målgrupper udover de primære kunder i form af kalibreringslaboratorierne

Det er ledelsens forventning, at den positive udvikling fortsætter og udbygges i 2012.



Steen Konradsen
Bestyrelsesformand

Michael Kjær
Adm. Direktør

MANAGEMENT REPORT 2011

In 2011 DFM continued the positive trend of recent years with increasing revenue and profit.

Total revenue was 20.1 million DKK compared to 19.2 million DKK in 2010, and the overall result was 1.0 million DKK versus 0.6 million DKK in 2010. The management considers both revenue and profit as being satisfactory.

Danish companies face growing metrology requirements in order to compete on global markets. Many Danish high-tech companies do not have the necessary metrology capabilities in-house, and it is important that DFM can effectively contribute to addressing these challenges. DFM is targeting the development of new metrology capabilities in areas of high importance to the society.

Participation in R&D projects, commercial contract research and development of new metrology services are all effective ways to stimulate the use of DFM's specialized metrology capabilities in the business community and society.

For this reason, DFM is pleased to have received funding for a growing number of R&D projects in 2011 as has been a goal in the current strategy. DFM has in 2011 filed a total of 14 new project applications, and participation in eight new projects was granted.

In parallel, DFM initiated new activities designed to highlight the importance of metrology specifically for Danish SMEs and also to help in addressing the metrology challenges that the SMEs face in their daily work. One result was the initiation of five new R&D projects in close collaboration with Danish high-tech SMEs.

Several new metrology services were developed in 2011 and efforts within this area will be further strengthened in 2012. The commercial sales increased from 2.2 million DKK in 2010 to 2.7 million DKK in 2011 primarily driven by an increase in commercial contract research and metrology services provided to Danish government agencies.

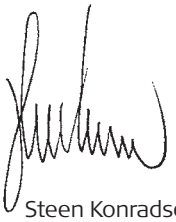
Fundamental metrology is the basis for international standardization, international acceptance of accreditations and qualification of new technologies. In the initiative "Innovation Union" undertaken by the European Commission, standardization plays an important role in promoting innovation and in implementation of new technology. The Commission is considering a further strengthening of metrology in Europe through the establishment of a "European Metrology Programme for Innovation and Research" in the Eighth Framework Programme.

As the National Metrology Institute of Denmark, DFM has a special obligation to conduct fundamental research within metrology, and it is our goal to be recognized among the leaders within the specific metrology areas we participate in. DFM is pleased that we have been able to increase the scientific staff in 2011 and strengthen our metrology research activities.

The Danish Agency for Science, Technology and Innovation on behalf of the Danish Council for Technology and Innovation conducted an external evaluation of the GTS (Advanced Technology Group) institutes including DFM. In the report evaluating the performance of DFM, some of the conclusions are:

- DFM provides critical infrastructure that contributes significantly to the Danish industry and business community by providing traceability at the highest international level and by taking care of Denmark's international obligations in the field of metrology
- DFM is able to balance and achieve synergies between its dual roles as the Danish National Metrology Institute and as a GTS (Advanced Technology Group) institute
- DFM is gifted with deeply committed employees and managers who are passionate about metrology
- DFM's association with the Technical University of Denmark is very beneficial for both parties and significant synergy effects are achieved within R&D
- DFM is working with diligence to ensure a financially sustainable foundation that will enable further growth
- DFM should focus on new customer segments beyond the calibration laboratories

The management expects that the positive trend will continue in 2012.



Steen Konradsen
Chairman of the Board

Michael Kjær
CEO

LARGE POTENTIAL IN SMALL ENTERPRISES

A cuvette with nanoparticles immersed in a liquid is illuminated by a laser and the scattered light is measured. The setup was developed for Particle Analytical A/S as a proof of concept for measuring the refractive index of nanoparticles.

Taking interest in metrology is no longer a luxury, nor is it relevant only to large, mature companies. To many high-tech start-up companies, accurate measurement of product properties is a prerequisite for survival. DFM has thorough experience in assisting SMEs.

"The large demand for product documentation applies to industry in general, but is especially challenging to SMEs. As a small high-tech start-up company you will naturally be extremely focused on technology development. It is difficult to find the time and energy necessary to engage in metrology related issues," says DFM's director Michael Kjær.

Depending of the nature of the problem of the SME in question, cooperation with DFM takes different forms. DFM is able to assist already during the process of development or can provide documentation, calibration and characterization of products.

Typically, the starting point of cooperation would be an identification of which parameters are essential to documenting the function and quality of the company's product. Further, the metrological requirements and appropriate procedures would be identified.

"We feel we are always welcome"
One SME, which DFM has been able to assist, is Heveas. Since the start-up company's foundation in 2009, Heveas has brought no less than four consumer products to market. The most recent is a pair of glasses to counteract winter fatigue.

Roughly one third of the Danish population suffers from winter fatigue. Therapy involving light has been demonstrated to counteract the condition – in most cases one hour of therapy on a daily basis is recommended. Normally therapy is given by lamps, requiring the patient to remain seated or lying during the therapy. Rather than this, Heveas' idea is to give therapy from a pair of glasses with a reflective screen enabling the patient to perform other tasks during therapy.

"We knew DFM has extensive experience in light characterization and also has undertaken investigations of a similar nature related to sunbeds," says Director Søren Søgaard Jensen.

"Although we do have a product on the market already, we have not stopped our development. We keep investigating whether the choice of materials and diodes could be optimized. And every time we have come up with something new, we know that we are welcome at DFM and can expect fast feedback. We may even get an answer by the same evening. Also, the cooperation always takes place in a cheerful atmosphere. This is something we really appreciate."

"They are really nerdy, luckily!"
Joint research in an innovation consortium brought Particle Analytical and DFM together. The cooperation is expected to open commercial doors, says the company's director Søren Lund Kristensen:

"We are already at the international cutting edge in characterization of micrometer-size particles. Through our cooperation with DFM we hope to develop our methods further, making them just as reliable when it comes to nano-particle characterization as they are for micrometer characterization."

A doubly curved stamp produced by Nil Technologies A/S is characterized by Atomic Force Microscopy at DFM

Particle characterization has wide applications, among others for manufacturers of catalysts or cosmetics. The main focus of Particle Analytical's services is pharmaceutical applications. In some pharmaceutical products such as many vaccines, nano-particles are frequent. Characterization of nano-particles constitutes new challenges.

"Analysis of the index of refraction of a particle is a key parameter in several of the methods, which we use for micrometer-size particle characterization. We are keen to apply these methods to nano-particles also. To do that we need new mathematic tools, which is where DFM is helping us out," Søren Lund Kristensen says adding with a smile:

"In our own field we are probably the best in the world, but we don't have the in-depth mathematical knowhow of DFM. They are really nerdy, luckily!"

"The cooperation has already yielded results"
NIL Technology (Nano Imprint Litography) manufactures stamps for imprinting nano-structures in a surface. It is possible to imprint structures that change the apparent color of the material. Such structures allow for entertaining, variable effects. Further, they can replace conventional methods for small size decorative elements such as facial features in a toy figure.

The company's cooperation with DFM was triggered by the NanoPlast project funded by the Danish National Advanced Technology Foundation. A range of companies and academic institutions cooperate in the project with the mutual aim of developing new nanotechnological methods within production of polymer products. The NanoPlast project will run for four years in total.

"In our part of the project, the supply chain will start with us manufacturing a stamp, which we will then ask DFM to assist us in characterizing. Next step will be for one of the other companies in the project to actually use the stamp for imprinting structures in polymer items. Then DFM will enter the stage once more in order to characterize these structures," Process and Development Manager Jesper Nørregaard, NIL Technology, explains.

"Already now, after the first year, the cooperation with DFM has given results, which we have implemented in our stamps. We expect to be able to implement results to an even higher degree as the project progresses further," Jesper Nørregard states.

Rising trend in DFM's cooperation with SMEs
Normally, DFM will interact with SMEs in its capacity as a GTS Institute. When relevant, DFM, which is also the National Metrology Institute of Denmark, can provide contact between a Danish company and foreign metrology capacities in a given field. Likewise, DFM can supply consultancy on international standards and legal demands concerning metrology.

Over recent years, DFM has engaged in cooperation with an increasing number of SMEs, and DFM's director Michael Kjær is confident that this trend will continue:

"We are pleased to be able to assist. Cooperation with SMEs is always an inspiration. Additionally, to a mature industrialized country like Denmark, SMEs are a key part of potential economic growth. Especially, high-tech start-up companies are essential. By supporting SMEs, DFM contributes to growth in Danish society.

SUPPORTING DANISH LASER INDUSTRY WITH NEW TECHNOLOGY

The picture shows a multi-channel laser system being prepared for shipment. The system includes 28 individual laser modules of the new frequency stabilized design.

In order to meet customers increasing demand for spectrally pure laser sources, NKT Photonics A/S decided in 2011 to develop a technique for active frequency stabilization of their highly-stable fibre laser products. DFM was engaged in the initial phase to speed up the development process.

DFM and NKT Photonics A/S have previously collaborated in various projects, including research in frequency stabilization of fibre lasers. Well aware of the competences at DFM, NKT Photonics decided to kick start the development of their latest ultra-stable fibre-based laser by involving DFM early in the process. The popular Koheras BasiK™ fibre laser produced by NKT Photonics has by design a very stable output in terms of frequency noise. A significant improvement in the intrinsic performance of the laser is not feasible, and active frequency stabilization of the laser output to an external frequency reference was required. It was a challenge to identify a potential frequency reference more stable than the laser itself while being so compact that the overall size of the laser module could be maintained.

DFM tested various candidates, and the data obtained helped to specify the requirements for a frequency reference with suitable physical and optical properties. DFM developed a proof-of-concept setup with a fibre laser stabilized to a compact bulk Fabry-Perot resonator (see facts box) using standard optical components and off-the-shelf scientific instruments. The results from this setup showed a clear reduction in the frequency noise of a laser in a quiet environment as well as reduced sensitivity to vibrations.

FABRY-PEROT RESONATOR

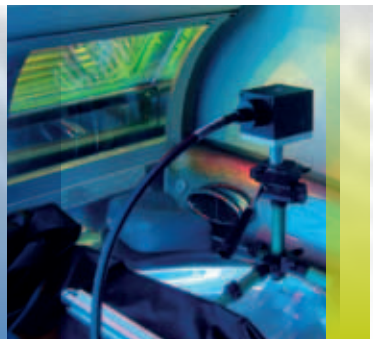
The Fabry-Perot resonator consists of two mirrors separated by a spacer. Normally, incident light is reflected by the mirrors. However, light is transmitted through the resonator at certain specific optical frequencies determined by the mirror spacing. These peaks, or resonances, in the transmission spectrum constitutes a frequency ruler and can be used as frequency references for active laser frequency stabilization.

Based on this demonstration of a working concept, NKT Photonics A/S designed the new laser. This laser includes a Fabry-Perot resonator developed specific for this application. Furthermore, the dedicated laser drive electronics is enhanced to include feedback loops for frequency locking the laser output to a Fabry-Perot resonance.

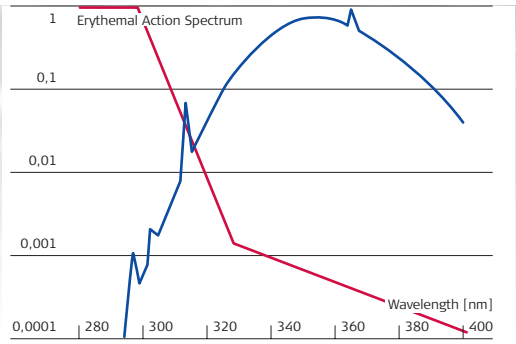
NKT Photonic's customers typically use the fibre lasers in sensors based on measurements of small phase differences between a reference light field and a probe light field. Applications of this technique include wind speed sensors and vibrational sensors. Ultimately, the performance of these sensors is limited by the frequency noise of the laser. Therefore, improving the frequency noise characteristics of the laser can lead to improvements in detection limits for the end users as well as opening new fields of applications.

In 2011 NKT Photonics received a major order on this new laser system, and the first batch of lasers were shipped just before the end of the year. The demand for these improved laser systems is expected to increase in the future, and it is expected that customers will continue to push their requirements in terms of frequency noise.

MEASUREMENTS OF LIGHT IMPROVE PUBLIC HEALTH



Setup for measuring UV light in sunbeds. The light collection system is placed in front of the UV source in the head end of the sunbed.



The red line shows the erythemal action spectrum that represents the sensitivity of skin to UV light. The blue curve shows a typical UV spectral distribution from a sunbed.

The SEQINETIC™ glasses

DFM is developing a spectroradiometric capability that allows accurate measurement of light sources in the UV and visible part of the spectrum. Two projects that demonstrate the versatility of the new measurement system are in progress.

Light in different parts of the UV and visible spectrum have very different physiological effects, and measurements with high accuracy are needed to determine the health effects of light sources. Furthermore the accurate characterization of light sources like lamps and LEDs is necessary in many applications. In order to serve the needs of the scientific community and customers in this area, DFM acquired a portable spectroradiometer in early 2011. This enables us to accurately measure light from UVC across the UV and visible spectrum to the beginning of the infrared region. Together with calibrated lamp sources the instrumentation makes it possible to characterize most spectral quantities.

Checking safety of sunbeds

The first project is an ongoing campaign in collaboration with the Danish Safety Technology Authority to measure the UV radiation of sunbeds to ensure compliance with national safety limits. The effect of UV light on skin is very dependent on the exact wavelength of the light (see the fact box). To obtain the necessary accuracy of measured wavelength, the portable equipment has to be calibrated against well-defined standards in the laboratory prior to the campaign. In the field the system is tested against portable light sources.

Optimizing light therapy

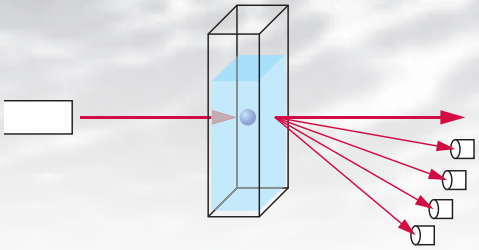
The second project that is under way is a collaboration between a private developer, HEVEAS, and DFM to develop a portable system for light therapy called SEQINETIC™. This project was funded by an "Innovation Voucher" issued by the Danish Agency for Science, Technology and Innovation. The aim of the project was to develop a pair of glasses, which incorporate a screen illuminated by white light LEDs that can be used for treatment against winter fatigue. The most important parameters in the development from DFM's point of view were the spectral composition and the brightness of the screen measured at the position of the eye.

Measurements showed that the light has a large amount of blue light, which is important to treat fatigue. Through close collaboration between DFM and the developer, the design was also optimized to achieve a brightness which is comparable to the brightness of other commercial products for light therapy when considering the smaller size of the screen. As a result of the close collaboration between HEVEAS and DFM, the design could progress from the initial idea to the finished product in about two months just in time for the winter season.

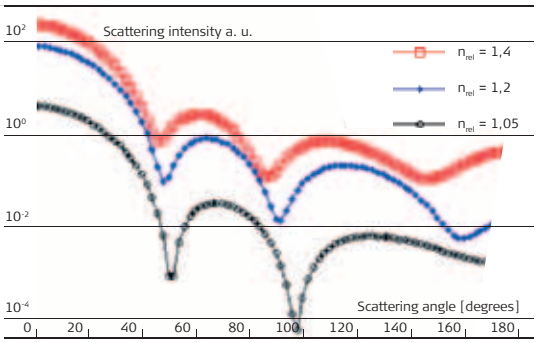
ACTION SPECTRA

Many physiological effects related to light are highly dependent on colour. This dependence is described by the action spectrum. The erythemal action spectrum shown in the centre figure describes the sensitivity of skin as a function of wavelength. The most significant feature is a sharp drop between 300 nm and 330 nm where the sensitivity drops by almost a factor 1000. For the SEQINETIC™ glasses, a priority was to deliver light in the blue spectral region. This is due to the connection between blue light and the regulation of melatonin which helps regulate the circadian rhythm (body clock).

PRECISE CHARACTERIZATION OF PHARMACEUTICAL NANOPARTICLES



Schematic presentation of the refractive index measurement setup. Laser light is sent on particles dispersed into different liquids. The scattering intensity is detected with photodetectors at different angles.



The scattering intensity decreases as the ratio n_{rel} of the refractive index of the particle to the refractive index of the liquid approaches one.

DFM developed and provided a prototype setup for measuring the refractive index of pharmaceutical micro and nano particles. In a joint project with a Danish SME about nanoparticle characterization (NaKIM), a method was implemented allowing a more precise optical characterization.

The Danish company Particle Analytical A/S is using scattering of laser light to measure the particle size of nano and micro particles for the pharmaceutical industry. In order to obtain reliable results, a method for precise determination of the refractive index had to be established. DFM has built and tested an optical system to measure the refractive index of micro and nanoparticles.

Scattering of light is a widely used technique for measuring the size of particles from about 100 nanometer to several micrometer in diameter. The method is based on the analysis of the scattering pattern when particles are exposed to a beam of light. Particles exhibiting a different refractive index than the surrounding medium scatter light into various directions. The size and the refractive index of the particles determine the intensity of the scattered light at every point in space. Therefore, when the refractive index is known, the size can be determined by mathematical analysis of the scattered light, and vice versa.

The method for measuring the refractive index developed by DFM is based on the fact that light is only scattered by particles having a different refractive index than the liquid in which they are dispersed. The scattered light intensity decreases when the refractive index of the liquid approaches that of the particles. Thus the method relies on finding liquids covering a range of refractive indices from below to above the one of the particles. DFM has demonstrated this technique for particles with well-known physical parameters, in order to validate the method, as well as for pharmaceutical particles where these parameters were fully unknown.

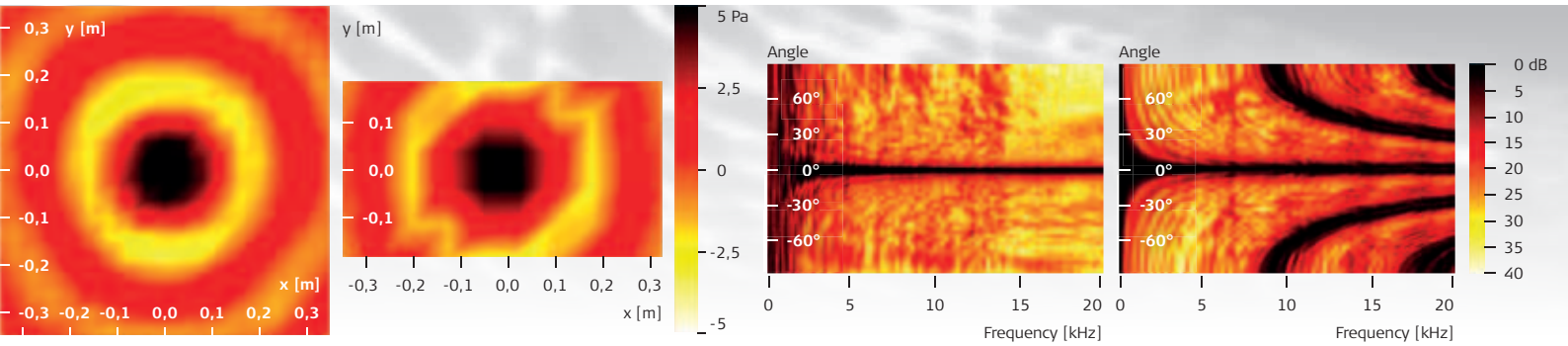
In future, the method will be automated and the optical setup improved. The application of the setup for biological materials will be evaluated. The final aim is to establish a reliable and quick method to determine the refractive index of micro and nano sized particles.

The project is supported by the Danish Agency of Science, Technology and Innovation.

REFRACTIVE INDEX

The refractive index is a highly important physical parameter of nano- and microparticles since it represents the optical characteristics of these. The knowledge of the refractive index is not only relevant for determining the size and shape of particles with optical methods, but also for many other experiments where diffracted or scattered light is analysed. Recently, nano- and micro-sized photonic structures were constructed by assembling nanoparticles, and in this case the optical properties of the particles are of highest importance.

SHEDDING LIGHT ON THE MEASUREMENT OF SOUND



A comparison of the sound field measured with an array of 60 microphones (centre left) and the reconstructed sound field from measurements of the acousto-optic effect (leftmost).

A comparison of the beamforming pattern measured with the Laser Doppler Vibrometer (centre right) and the pattern measured with an array of microphones (right most). The sound source was aligned at an angle of 0° with respect to the direction of the LDV beam. The thin area in black at an angle of 0° degrees shows the directional discrimination capability of the acousto-optic beamformer; notice the spurious artifacts introduced by spatial aliasing in the pattern determined with the microphone array.

Traditionally sound measurements or the recording of sound are performed using a microphone that senses the tiny variations of pressure in the medium of propagation. Microphones are undoubtedly very suitable sound sensing instruments. However, when a physical object such as a microphone is placed in the path of a sound wave, the sound wave to be measured is changed. DFM is investigating the use of light for imaging sound waves thus avoiding this problem.

Interaction between sound and light: How it works

When a sound wave travels in a medium, it causes variations in the pressure and hence in the density of the medium. These changes will minutely affect the speed of light propagating in the medium; a phenomenon known as the acousto-optic effect. These changes of speed lead to a delay or phase shift with respect to the "expected" arrival time of a propagating light beam. A Laser Doppler Vibrometer (LDV) can be used for measuring the phase shift between an outgoing beam and its reflection from a surface. If the surface is stationary the vibrometer will measure the changes of density in the medium and hence sound in an indirect way.

The measured phase shift is a sum of all the minute shifts along the light beam. This can be interpreted as a projection of the sound field along the path; similar to how a point in an X-ray picture shows the sum of the absorption through the body

Sound field reconstruction

Recording of a sufficient number of projections at various positions and angles, will allow for a reconstruction of the sound field in a plane. The reconstruction is done with tomographic algorithms, which are used e.g. for CAT scanning of the human body. The application of this reconstruction method results in a detailed picture of the sound field. As an example, the reconstructed sound field originating from a loudspeaker is shown in the figures to the left.

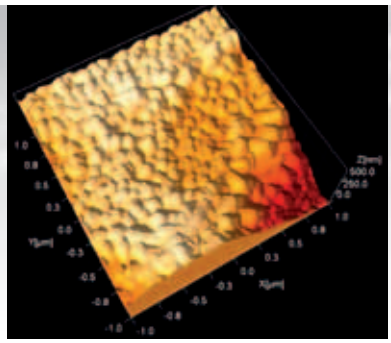
Beamforming

Microphone arrays called beamformers can be used to find the direction from which a sound originates. However, there are limitations on the number of microphones that can be put into such an array. The finite distance between microphones introduces a problem known as spatial aliasing; spatial aliasing effectively limits the useful frequency range of the beamformer by introducing spurious artifacts in the beamforming pattern (see figures to the right). As an alternative, the projection of the sound field in several directions can be measured by a vibrometer, and the same information can be obtained without interfering with the sound field and without spatial aliasing effects.

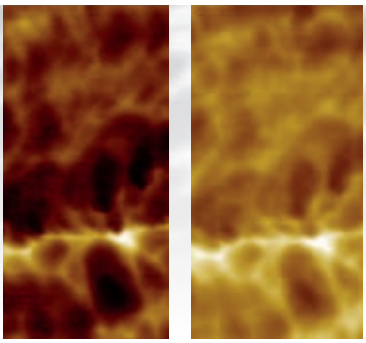
Perspective

The application of Laser Doppler Vibrometry for sound measurement has a great potential. The reconstruction of sound fields based on the acousto-optic effect can lead to new measurement techniques that can improve and extend the capabilities of the existing methods for acoustical holography and determination of sound power. Other possibilities are applications where microphones may not be suitable (in the presence of high temperatures, airflows, etc.). DFM will in collaboration with DTU Electro investigate the performance and applications of the acousto-optical techniques in such applications.

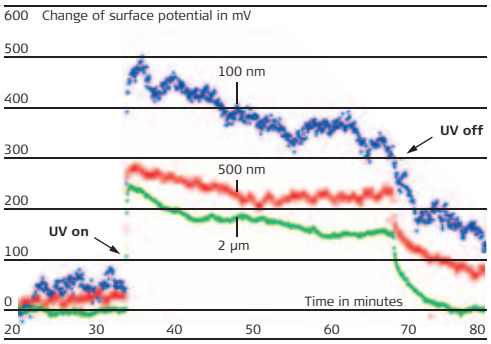
SELF-CLEANSING EFFECTS OF NANOPARTICLE-COATED SURFACES



3D AFM image of a nano-coated surface. The individual TiO_2-crystals can be seen. The colouring represents topographic height.



2D AFM images measured at the same location with UV off (left) and on (right). The colouring represents the level of the local surface potential. The difference indicates a raise in photo-catalytic activity caused by the UV-light.



Three potential profiles measured for different coating thick-nesses during periods with UV-light (high values) and without UV-light (low values). The switching points are indicated.

DFM employs its Atomic Force Microscope to visualize and measure aluminium surfaces coated with nanoparticles. This is done in support of a research project at the DTU department of Mechanical Engineering funded by the Danish National Advanced Technology Foundation. These nanoparticles have the property that they decompose surface pollutants and render a surface sterile when exposed to ultra-violet light.

Surfaces coated with nanoparticles can achieve functionalities that are unattainable with ordinary surface modification methods such as polishing. Corrosion protection and sterility are critical issues for many applications of exposed surfaces. Already thirty years ago, the oxidative power of titanium dioxide (TiO_2) particles was known to dispose of surface pollutants when exposed to ultra-violet (UV) light. However, the process of coating surfaces with engineered nanoparticles purposefully is relatively new and still under investigation. Similarly, anti-microbial and detoxifying effects of TiO_2 are being explored today for a wide variety of applications.

The Atomic Force Microscope (AFM) of DFM can not only visualize and measure the surface topography of the coating at the nanometer scale in three dimensions, see the figure to the left. Its additional functionality as a "Kelvin probe" allows simultaneous, local measurement of the surface potential. Samples of aluminium with three different surface coatings were analysed in cooperation with DTU Mechanical Engineering to support a project funded by the Danish National Advanced Technology Foundation. The coatings differ in thickness, and the surface potential is mapped both with and without UV-exposure to estimate the photo-catalytic effect, see the figure in the middle. It can be seen that a layer with a thickness of only 100 nanometer produces the largest change in the surface potential, see the figure to the right. The overall results of the project help to minimize waste of TiO_2 material and avoid unnecessary pollution during the coating process. In addition, the AFM measurements are verified and confirmed with ordinary electrochemical methods. Thereby the link between the local AFM measurements and macroscopic methods is established.

TIO_2

Titanium dioxide (TiO_2) is a naturally occurring oxide of titanium. It exists in three different crystal forms, namely rutile, anatase and brookite. In general, TiO_2 has a high refractive index. Particles of different sizes have therefore been used as white pigments for example in paints, inks, plastics and tooth pastes. They are also effectively used in skin care products to block UV-light. In addition to this, especially the anatase form of TiO_2 shows a high degree of photo-catalytic activity. That is, chemical reactions are facilitated at the surface of the particles when exposed to UV-light. The UV-light generates a local electric charge in the crystal, which turns adsorbed water molecules (e.g. from the humidity in the air) into free radicals. The high reactivity of these radicals helps to decompose dirt and kill bacteria.

ÅRSREGNSKAB FOR PERIODEN 2011-01-01 TIL 2011-12-31

LEDELSESPÅTEGNING

Bestyrelse og direktion har dags dato behandlet og godkendt årsrapporten for regnskabsåret 1. januar – 31. december 2011 for Dansk Fundamental Metrologi A/S.

Årsrapporten er aflagt i overensstemmelse med årsregnskabsloven.

Det er vores opfattelse, at årsregnskabet giver et retvisende billede af selskabets aktiver, passiver og finansielle stilling pr. 31. december 2011 samt af resultatet af selskabets aktiviteter og pengestrømme for regnskabsåret 1. januar - 31. december 2011.

Det er endvidere vores opfattelse, at ledelsesberetningen indeholder en retvisende redegørelse for de forhold beretningen omhandler.

Årsrapporten indstilles til generalforsamlingens godkendelse.

Kgs. Lyngby, den 21. marts 2012

DIREKTION

Michael Kjær
Direktør

BESTYRELSE

Lars Barkler

Niels Axel Nielsen
Næstformand

René Logie Damkjer

Kai Dirscherl
Medarbejderrepræsentant

Steen Konradsen
Formand

Jan Conrad Petersen
Medarbejderrepræsentant

Søren Stjernqvist

DEN UAFHÆNGIGE REVISORS ERKLÆRINGER

TIL KAPITALEJERNE I DANSK FUNDAMENTAL METROLOGI A/S

Påtegning på årsregnskabet
Vi har revideret årsregnskabet for Dansk Fundamental Metrologi A/S for regnskabsåret 1. januar - 31. december 2011. Årsregnskabet omfatter anvendt regnskabspraksis, resultatopgørelse, balance, pengestrømsopgørelse og noter. Årsregnskabet udarbejdes efter årsregnskabsloven.

Ledelsens ansvar for årsregnskabet
Ledelsen har ansvaret for udarbejdelsen af et årsregnskab, der giver et retvisende billede i overensstemmelse med årsregnskabsloven. Ledelsen har endvidere ansvaret for den interne kontrol, som ledelsen anser nødvendig for at udarbejde et årsregnskab uden væsentlig fejlinformation, uanset om denne skyldes besvigelser eller fejl.

Revisors ansvar
Vores ansvar er at udtrykke en konklusion om årsregnskabet på grundlag af vores revision. Vi har udført revisionen i overensstemmelse med internationale standarder om revision, god offentlig revisionsskik jf. revisionsinstruks for revisor ved Godkendte Teknologiske Institutter (GTS) og yderligere krav ifølge dansk revisorlovgivning. Dette kræver, at vi overholder etiske krav samt planlægger og udfører revisionen for at opnå høj grad af sikkerhed for, om årsregnskabet er uden væsentlig fejlinformation.

En revision omfatter udførelse af revisionshandlinger for at opnå revisionsbevis for beløb og oplysninger i årsregnskabet. De valgte revisionshandlinger afhænger af revisors vurdering, herunder vurderingen af risici for væsentlig fejlinformation i årsregnskabet, uanset om denne skyldes besvigelser eller fejl. Ved risikovurderingen overvejer revisor intern kontrol, der er relevant for selskabets udarbejdelse af et årsregnskab, der giver et retvisende billede. Formålet hermed er at udforme revisionshandlinger, der er passende efter omstændighederne, men ikke at udtrykke en konklusion om effektiviteten af selskabets interne kontrol. En revision omfatter endvidere vurdering af, om ledelsens valg af regnskabspraksis er passende, om ledelsens regnskabsmæssige skøn er rimelige samt den samlede præsentation af årsregnskabet.

Det er vores opfattelse, at det opnåede revisionsbevis er tilstrækkeligt og egnet som grundlag for vores konklusion.

Revisionen har ikke givet anledning til forbehold.

Konklusion
Det er vores opfattelse, at årsregnskabet giver et retvisende billede af selskabets aktiver, passiver og finansielle stilling pr. 31. december 2011 samt af resultatet af selskabets aktiviteter og pengestrømme for regnskabsåret 1. januar - 31. december 2011 i overensstemmelse med årsregnskabsloven.

Udtalelse om ledelsesberetningen
Vi har i henhold til årsregnskabsloven gennemlæst ledelsesberetningen. Vi har ikke foretaget yderligere handlinger i tillæg til den udførte revision af årsregnskabet. Det er på denne baggrund vores opfattelse, at oplysningerne i ledelsesberetningen er i overensstemmelse med årsregnskabet.

København, den 21. marts 2012
KPMG, Statsautoriseret Revisionspartnerselskab

Peter Gath, statsaut. revisor

Charlotte Formsgaard, statsaut. revisor

ANVENDT REGNSKABSPRAKSIS

Generelt
Årsrapporten for Dansk Fundamental Metrologi A/S (DFM) for 2011 er aflagt i overensstemmelse med årsregnskabslovens bestemmelser for klasse B-virksomheder. Herudover har selskabet frivilligt tilvalgt følgende regler for klasse C-virksomheder:

+ Aflæggelse af ledelsesberetning.
+ Udarbejdelse af pengestrømsopgørelse.

Årsregnskabet er aflagt efter samme regnskabspraksis som sidste år.

Generelt om indregning og måling
Aktiver indregnes i balancen, når det er sandsynligt, at fremtidige økonomiske fordele vil tilflyde selskabet, og aktivets værdi kan måles pålideligt.

Forpligtelser indregnes i balancen, når det er sandsynligt, at fremtidige økonomiske fordele vil fragå selskabet, og forpligtelsens værdi kan måles pålideligt.

Ved første indregning måles aktiver og forpligtelser til kostpris. Efterfølgende måles aktiver og forpligtelser som beskrevet for hver enkelt regnskabspost nedenfor.

Visse finansielle aktiver og forpligtelser måles til amortiseret kostpris, hvorved der indregnes en konstant effektiv rente over løbetiden. Amortiseret kostpris opgøres som oprindelig kostpris med fradrag af eventuelle afdrag og tillæg/fradrag af den akkumulerede amortisering af forskellen mellem kostpris og nominelt beløb.

Ved indregning og måling tages hensyn til gevinster, tab og risici, der fremkommer, inden årsrapporten aflægges, og som be- eller afkræfter forhold, der eksisterede på balancedagen.

Indtægter indregnes i resultatopgørelsen i takt med, at de indtjenes, herunder indregnes værdireguleringer af finansielle aktiver og forpligtelser, der måles til dagsværdi eller amortiseret kostpris. Endvidere indregnes omkostninger, der er afholdt for at opnå årets indtjening, herunder afskrivninger, nedskrivninger og hensatte forpligtelser samt tilbageførsler som følge af ændrede regnskabsmæssige skøn af beløb, der tidligere har været indregnet i resultatopgørelsen.

Omregning af fremmed valuta
Transaktioner i fremmed valuta omregnes ved første indregning til transaktionsdagens kurs. Valutakursdifferencer, der opstår mellem transaktionsdagens kurs og kursen på betalingsdagen, indregnes i resultatopgørelsen som en finansiel post.

Tilgodehavender, gæld og andre monetære poster i fremmed valuta omregnes til balancedagens valutakurs. Forskellen mellem balancedagens kurs og kursen på tidspunktet for tilgodehavendets eller gældsforpligtelsens opståen eller indregning i seneste årsregnskab indregnes i resultatopgørelsen under finansielle indtægter og omkostninger.

Anlægsaktiver, der er købt i fremmed valuta, måles til kursen på transaktionsdagen.

RESULTATOPGØRELSEN

Nettoomsætning
Indtægter fra forskningskontrakter indregnes i takt med at arbejdet udføres, hvorved nettoomsætningen svarer til salgsværdien af årets udførte arbejder (produktionsmetoden). Nettoomsætningen indregnes, når de samlede indtægter og omkostninger på forskningskontrakten og færdiggørelsesgraden på balancedagen kan opgøres pålideligt, og det er sandsynligt, at de økonomiske fordele, herunder betalinger, vil tilgå selskabet.

I projekter, hvor DFM er tilskudsmodtager på vegne af et konsortium, indregnes tilskudsbeløbet som omsætning, i det omfang DFM på vegne af konsortiet er økonomisk ansvarlig over for tilskudsgiver; partneres omkostninger fradrages i udlæg. I projekter hvor DFM ikke er ansvarlig for partneres ydelser indregnes kun den forholdsmæssige andel af kontraktsummen, som direkte tilfalder DFM, i omsætningen.

Indtægter fra resultatkontraktaktiviteter indtægtsføres i det år tilskuddene modtages, som er sammenfaldende med den tilladte anvendelsesperiode.

Finansielle indtægter og omkostninger
Finansielle indtægter og omkostninger indeholder renter, realiserede og urealiserede kursgevinster og -tab vedrørende værdipapirer, gæld og transaktioner i fremmed valuta, samt tillæg og godtgørelser under acontoskatteordningen m.v.

Skat af årets resultat
Årets skat, som består af årets aktuelle skat og forskydning i udskudt skat, indregnes i resultatopgørelsen med den del, der kan henføres til årets

resultat, og direkte i egenkapitalen med den del, der kan henføres til bevægelser direkte i egenkapitalen.

BALANCEN

Materielle anlægsaktiver
Materielle anlægsaktiver måles til kostpris med fradrag af akkumulerede afskrivninger. Afskrivningsgrundlaget er kostpris med fradrag af forventet restværdi efter afsluttet brugstid. Kostprisen omfatter anskaffelsesprisen samt omkostninger direkte tilknyttet anskaffelsen indtil det tidspunkt, hvor aktivet er klar til brug.

Udstyr og inventar afskrives lineært over den forventede driftsøkonomiske brugstid, som er 3-7 år til en restværdi på 0-20% af anskaffelsesprisen.

Indretning af lejede lokaler afskrives lineært baseret på aktivernes forventede brugstid.

Udstyr og inventar overdraget 1. januar 2006 fra den selvejende institution Dansk Institut for Fundamental Metrologi afskrives med en særlig afskrivningsprofil over 6 år til en restværdi på 20%.

Anskaffelser med en anskaffelsessum på under 20 000 kr., udstyr anskaffet for offentlige tilskudsmidler samt mindre kontorinventar indregnes i resultatopgørelsen i anskaffelsesåret.

Fortjeneste eller tab ved afhændelse af materielle anlægsaktiver opgøres som forskellen mellem salgspris med fradrag af salgsomkostninger og den regnskabsmæssige værdi på salgstidspunktet. Fortjeneste eller tab indregnes i resultatopgørelsen under afskrivninger.

Igangværende arbejder
Igangværende arbejder for fremmed regning måles til salgsværdien af det udførte arbejde omfattende medgået tid samt afholdte udlæg. Salgsværdien måles på baggrund af færdiggørelsesgraden på balancedagen og de samlede forventede indtægter på det enkelte igangværende arbejde.

Når salgsværdien på en forskningskontrakt ikke kan opgøres pålideligt, måles salgsværdien til de medgåede omkostninger eller nettorealisationsværdien, såfremt denne er lavere.

Det enkelte igangværende arbejde indregnes i balancen under tilgodehavender eller gældsforpligtelser afhængig af nettoværdien af salgssummen med fradrag af àconto faktureringer og forudbetalinger.

Omkostninger i forbindelse med salgsarbejde og opnåelse af kontrakter indregnes i resultatopgørelsen i takt med, at de afholdes.

Tilgodehavender
Tilgodehavender måles til amortiseret kostpris. Der nedskrives til imødegåelse af forventede tab efter en individuel vurdering af tilgodehavender.

Værdipapirer
Værdipapirer, indregnet under omsætningsaktiver, består af obligationer. Værdipapirer måles til dagsværdi på balancedagen.

Selskabsskat og udskudt skat
Aktuelle skatteforpligtelser og tilgodehavende aktuel skat indregnes i balancen som beregnet af årets skattepligtige indkomst, reguleret for skat af tidligere års skattepligtige indkomster samt for betalte acontoskatter.

Udskudt skat måles efter den balanceorienterede gældsmetode af alle midlertidige forskelle mellem regnskabsmæssige og skattemæssig værdi af aktiver og forpligtelser.

Udskudte skatteaktiver, herunder skatteværdien af fremførselsberettigede skattemæssige underskud, måles til den værdi, hvortil de forventes at kunne realiseres, enten ved udligning i skat af fremtidig indtjening eller ved modregning i udskudte skatteforpligtelser inden for samme juridiske skatteenhed. Eventuelle udskudte nettoaktiver måles til nettorealisationsværdi.

Udskudt skat måles på grundlag af de skatteregler og skattesatser, der med balancedagens lovgivning vil være gældende, når den udskudte skat forventes udløst som aktuel skat. Ændring i udskudt skat som følge af ændringer i skattesatser indregnes i resultatopgørelsen.

Pengestrømsopgørelse
Pengestrømsopgørelsen viser selskabets pengestrømme fordelt på drifts-, investerings- og finansieringsaktivitet for året, årets forskydning i likvider samt selskabets likvider ved årets begyndelse og slutning.

RESULTATOPGØRELSE OG BALANCE

RESULTATOPGØRELSE (tkr.)

Noter		2011	2010
	Kommerciel omsætning	2 731	2 196
	Projektomsætning	3 326	3 348
	Resultatkontrakt	14 066	13 630
	Nettoomsætning i alt	**20 123**	**19 174**
	Rejseomkostninger	378	422
	Andre udlæg	1 804	1 424
	Udlæg i alt	**2 182**	**1 846**
1	**Bruttoresultat**	**17 941**	**17 328**
2	Personaleomkostninger	12 271	12 445
	Andre eksterne omkostninger	3 579	3 197
	Omkostninger i alt	**15 850**	**15 642**
	Resultat før afskrivninger	**2 091**	**1 686**
3	Af- og nedskrivninger af materielle anlægsaktiver	1 545	1 164
	Resultat før finansielle poster	**546**	**521**
	Finansielle indtægter	417	166
	Finansielle omkostninger	2	118
4	**Resultat før skat**	**961**	**569**
	Skat af årets resultat	0	0
	Årets resultat	**961**	**569**
	Årets resultat overføres til næste år.		

BALANCE PR. 31 DECEMBER (tkr.)

Noter	AKTIVER	2011	2010
	Deposita	372	372
	Finansielle anlægsaktiver i alt	**372**	**372**
	Udstyr og inventar	4 169	4 114
	Indretning af lejede lokaler	1 865	2 189
3	**Materielle anlægsaktiver i alt**	**6 034**	**6 303**
	Anlægsaktiver i alt	**6 406**	**6 675**
5	**Igangværende arbejder for fremmed regning**	**1 554**	**1 040**
	Tilgodehavender fra salg og tjenesteydelser	496	352
	Tilgodehavender hos modervirksomhed	0	199
	Periodeafgrænsningsposter	99	0
	Andre tilgodehavender	186	205
	Tilgodehavender i alt	**781**	**756**
	Værdipapirer	**5 010**	**4 789**
	Likvide midler	**3 576**	**4 008**
	Omsætningsaktiver i alt	**10 921**	**10 593**
	Aktiver i alt	**17 327**	**17 268**

	PASSIVER	2011	2010
	Aktiekapital	1 000	1 000
	Overført resultat	13 410	12 449
6	**Egenkapital i alt**	**14 410**	**13 449**
5	Forudbetalinger fra kunder og bevillingsgivere	304	512
	Forudbetalte resultatkontraktmidler	61	129
	Kreditorer og skyldige omkostninger	690	1 417
	Anden gæld	1 862	1 761
	Kortfristet gæld i alt	**2 917**	**3 819**
	Passiver i alt	**17 327**	**17 268**
7	Eventualforpligtelser		

PENGESTRØMSOPGØRELSE

PENGESTRØMSOPGØRELSE (tkr.)

Noter		2011	2010
	Periodens resultat før renter og afskrivninger	2 091	1 686
	Ændring i igangværende arbejder for fremmed regning	(514)	103
	Ændring i tilgodehavender fra salg og tjenesteydelser	(144)	344
	Ændringer i andre tilgodehavender og periodeafgrænsningsposter	118	(97)
	Ændring i kortfristede gældsforpligtelser	(902)	480
	Pengestrømme fra driften	**649**	**2 516**
3	Køb og salg af materielle anlægsaktiver	(1 276)	(1 343)
	Køb og salg af værdipapirer	0	(4 896)
	Pengestrøm fra investeringsaktivitet	**(1 276)**	**(6 239)**
	Renteindtægter og -omkostninger	195	155
	Pengestrøm fra finansieringsaktivitet	**195**	**155**
	Periodens likviditetsforskydning	**(432)**	**(3 568)**
	Likvide beholdninger primo	4 008	7 576
	Likvide beholdninger ultimo	**3 576**	**4 008**

1 Efterkalkulerede egenfinansierede forsknings- og udviklingsomkostninger er opgjort til 1.184 tusinde kroner (2010: 1.581 tkr.)

2

Personaleomkostninger (tkr.)	**2011**	**2010**
Løn og gager	12 015	12 197
Pensioner	96	99
Andre omkostninger til social sikring	160	149
Personaleomkostninger i alt	**12 271**	**12 445**

DFM har i 2011 i gennemsnit beskæftiget 21 medarbejdere (2010: 20). Løn og gager indeholder vederlag til direktionen og bestyrelseshonorar.

3 **Materielle anlægsaktiver (tkr.)**

Anskaffelsessum	**Udstyr og Inventar**	**Indretning af lokaler**	**Arkivalier**	**I alt**
Saldo 2011-01-01	8 632	3 701	760	13 093
Tilgang	1 276	0	0	1 276
Afgang	0	0	0	0
Saldo 2011-12-31	9 908	3 701	760	14 369
Af- og nedskrivninger				
Saldo 2011-01-01	4 518	1 512	760	6 790
Afskrivninger	933	324	0	1 257
Nedskrivninger	288	0	0	288
Saldo 2011-12-31	5 739	1 836	760	8 335
Bogført værdi 2011-12-31	**4 169**	**1 865**	**0**	**6 034**
Årets af- og nedskrivninger i alt	**1 221**	**324**	**0**	**1 545**

4

Skat af årets resultat	**2011**	**2010**
Beregnet skat af årets skattepligtige indkomst	0	0
Årets regulering af udskudt skat	0	0
Beregnet skat af årets skattepligtige indkomst i alt	**0**	**0**

Skatteværdien af ikke indregnet skatteaktiv udgør ca. 591 tkr.

5

Igangværende arbejder for fremmed regning og forudbetalinger fra kunder og bevillingsgivere (tkr.)	**Igangværende arbejder**		**Forudbetalinger**	
	2011	**2010**	**2011**	**2010**
Offentlige danske institutioner	1 203	764	184	422
Danske Virksomheder	139	0	0	0
Udenlandske institutioner	212	276	120	90
I alt	**1 554**	**1 040**	**304**	**512**

6

Egenkapital (tkr.)	**Aktiekapital**	**Overført resultat**	**I alt**
Egenkapital 2011-01-01	1 000	12 449	13 449
Årets resultat	0	961	961
Egenkapital i alt	**1 000**	**13 410**	**14 410**

Der er udstedt 1 000 000 aktier med pålydende værdi på 1 kr.

Ejerforhold
Følgende aktionær ejer hele aktiekapitalen:

Danmarks Tekniske Universitet
Anker Engelundsvej 1
2800 Kgs. Lyngby

7 **Eventualforpligtelser**
Selskabet har en lejeforpligtelse overfor modervirksomheden DTU vedrørende lejemål med en opsigelsesperiode på op til 12 måneder, svarende til 955 tkr. (2010: 865 tkr.)

Participation in committees and working groups under the Metre Convention and EURAMET

+ EMRP Committee
+ Consultative Committee for Electricity and Magnetism (CCEM)
+ Consultative Committee for Amount of Substance (CCQM)
+ Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV)
+ EURAMET Technical Committee for Mass (TC-M)
+ EURAMET Technical Committee for Electricity and Magnetism (TC-EM)
+ EURAMET Technical Committee for Length (TC-L)
+ EURAMET Technical Committee for Photometry and Radiometry (TC-PR)
+ EURAMET Technical Committee for Acoustics, Ultrasound and Vibration (TC-AUV)
+ EURAMET Technical Committee for Time and Frequency (TC-TF)
+ EURAMET Technical Committee for Interdisciplinary Metrology (TC-IM)
+ EURAMET Technical Committee for Quality (TC-Q)
+ EURAMET Technical Committee for Metrology in Chemistry (TC-MC)
+ BIPM Director's ad hoc Advisory Group on Uncertainty
+ Joint Committee on Guides in Metrology – Working Group 1, Guide to the expression of uncertainty in measurement (JCGM-WG1)
+ Consultative Committee for Length – Working Group on Dimensional Metrology – Discussion Group on Nanometrology (CCL-WGDM-DG7)
+ Consultative Committee for Amount of Substance – Working Group on Electrochemical Analysis (CCQM – EAWG)
+ Consultative Committee for Mass and Related Quantities – Working Group on Changes to the SI kilogram (CCM-WGSI-kg)
+ Consultative Committee for Mass and Related Quantities – Working Group on Mass Standards – Task Group 2; Uncertainty components due to traceability to the international prototype of the kilogram (CCM-WGM-TG2)

Participation in national and international projects

+ Determination of the Boltzmann constant for the redefinition of the kelvin, EMRP/RTI
+ Breath analysis as a diagnostic tool for early disease detection, EMRP/RTI
+ Traceable measurements for biospecies and ion activity in clinical chemistry, EMRP/RTI
+ Nano- og mikropartikler – karakterisering, innovative anvendelser og miljørigtig teknologi (NaKIM), RTI
+ Optisk afstandssensor, RTI
+ Metrology for biofuels (Biofuels), EMRP/RTI
+ Nanoplast, HTF
+ Udmåling af kraniets bevægelser, RTI
+ Polynano, DSF
+ Metrology for chemical pollutants in air (MACPoll), EMRP/RTI
+ Metrology of small structures for the manufacturing of electronic and optical devices (Scatterometry), EMRP/RTI
+ New generation of frequency standards for industry (Frequency), EMRP/RTI

Calibration certificates and measurement reports

+ DC electricity	5
+ Electrochemistry	228
+ Mass	9
+ Length	10
+ Optical radiometry	181
+ Nano structures	4
+ Acoustics	5
+ Total	442

Publications in refereed journals

+ Richard K Leach, Robert Boyd, Theresa Burke, Hans-Ulrich Danzebrink, Kai Dirscherl, Thorsten Dziomba, Mark Gee, Ludger Koenders, Valérie Morazzani, Allan Pidduck, Debdulal Roy, Wolfgang E S Unger and Andrew Yacoot, The European nanometrology landscape, Nanotechnology 22 (2011), DFM-2011-P01

+ Jan Hald, Lars Nielsen, Jan C. Petersen, Poul Varming and Jens E. Pedersen, Fiber laser optical frequency standard at 1.54 µm, Optics Express, Vol. 19, Issue 3, pp. 2052-2063 (2011), DFM-2011-P02

+ M. Karamehmedovic, P.-E. Hansen, T. Wriedt, An efficient scattering model for PEC and penetrable nanowires on a dielectric substrate, Journal of the European Optical Society – Rapid Publications, 11021 Vol 6 (2011), DFM-2011-P03

+ Antonio Torras-Rosell, Finn Jacobsen, A New Interpretation of Distortion Artifacts in Sweep Measurements, J. Audio Eng. Soc., Vol. 59, No. 5, (2011), DFM-2011-P04

+ M. Karamehmedovic, P.-E. Hansen, T. Wriedt, A fast inversion method for highly conductive submicron wires on a substrate, Journal of the European Optical Society – Rapid Publications, 11039 Vol 6 (2011), DFM-2011-P05

+ B. B. Jensen, P .G. Westergaard, K. Gunnarsson, M.H. Madsen, A. Brusch, J. Hald, J. W. Thomsen, Experimental Determination of the 24Mg I (3s3p)3P2 Lifetime, Phys. Rev. Lett. 107, 113001 (2011), DFM-2011-P06

+ P.-E. Hansen, B. Bilenberg, Y. R. Shenc and M. Karamehmedovic, Profiles of complex periodic structures determined by scatterometry, 13th International Conference on Metrology and Properties of Engineering Surfaces, 12. – 15. April 2011, DFM-2011-P07

+ M. Karamehmedovic, M.-P. Sørensen, P.-E. Hansen and A. Lavrinenko, Application of the Method of Auxiliary Sources in Optical Diffraction Microscopy, Proceedings ECMI 2008 conference, Mathematics for the Further of Europe, London, UK, June 30 – July 4, DFM-2011-P08

+ Jørgen Garnæs, Diameter measurements of polystyrene particles with atomic force microscopy, Meas. Sci. Technol. 22 (2011) 094001, DFM-2011-P09

Other reports

+ Lars Nielsen, Pia Tønnes Jakobsen, Jan C. Petersen, DFM Årsrapport 2010, DFM-2011-R01

+ Jan Hald, Report for the QMS re-evaluation of Danish Fundamental Metrology, DFM-2011-R02

+ Pia Tønnes Jakobsen, DFM Measurement report for CCQM-K92, DFM-2011-R03

+ Kai Dirscherl, Evaluering af måleopstillingen til registrering af kraniebevægelser, DFM-2011-R04

+ Antoni Torras Rosell, Sound pressure measurement based on the acousto-optic effect, DFM-2011-R05

+ Antoni Torras Rosell, Sound pressure measurement based on the acousto-optic effect – Part II, DFM-2011-R06

+ Pia Tønnes Jakobsen, DFM Measurement report for CCQM-K91, DFM-2011-R07

+ Kai Dirscherl, Investigation of nanoparticle coating with an AFM, DFM-2011-R08

+ Kai Dirscherl, Roughness measurements on filter membranes with an AFM, DFM-2011-R09

+ Kai Dirscherl, Dybdemåling med et Atomic Force Mikroskop, DFM-2011-R10

+ Antoni Torras Rosell, Design of a Laser Pistonphone, DFM-2011-R11

+ Johannes Weirich, Investigation of optical properties of particles on substrates, DFM-2011-R12

+ Poul Erik Hansen, Beregningerne af hulkernefiber, DFM-2011-F01

+ Poul Erik Hansen, Måling af PCF Fiber, DFM-2011-F02

+ Michael Kjær, Hans D. Jensen, Jan C. Petersen, Isabella Stendal, DFM Selvevaluering, DFM-2011-F03

+ Michael Kjær, Hans D. Jensen, Jan C. Petersen, og Isabella Stendal, Faglig rapportering til Rådet for teknologi og Innovation for 2010, DFM-2011-F04

+ Michael Kjær, Lars Nielsen, Masse metrologi på DFM – samfundsbehov, investeringer og sammenhæng med øvrige aktiviteter, DFM-2011-F05

+ Michael Kjær, Forventninger til udvikling i perioden 2011-2018, DFM-2011-F06

+ Kai Dirscherl, Lars Lundgreen Larsen, Preliminary Metrologic Evaluation of IMD-A-350 DFM-2011-F07

+ Jørgen Garnæs, Hardness of polystyrene nanoparticles and the influence on deformation, DFM-2011-F08

+ Jeppe Clausen, Alexander B. Christiansen, Jørgen Garnæs, N. Asger Mortensen and Anders Kristensen, Color Effects from Scattering on Random Structures Fabricated in Hybrid Polymer, DFM-2011-F09

+ Johannes Weirich, Distance measurement by scanning Fresnel diffraction patterns, DFM-2011-F10

+ Johannes Weirich, Refractive Index Determination of Nanoparticles, DFM-2011-F11

Reports in the series F01-F11 are confidential

Contributions at conferences

+ Poul Erik Hansen, Kai Dirscherl, Three dimensional nanostructures measured with generalized ellipsometry, UK Surface Analysis Forum "UKSAF", London, UK, 12 January 2011

+ J. Garnaes, Uncertainty and Calibration of AFM using Transfer Standards, EURAMET mAFM Workshop, Paris, France, 5th – 7th February 2011

+ Poul Erik Hansen, Johannes Weirich, Kai Dirscherl, How to measure nano-structures on surfaces from scattered intensities, Workshop "Nano structures on surfaces and light scattering", Bremen, Germany, 24- 25 March 2011

+ Jan Hald, Charlotte I. Falk, Anders Simonsen, Anders Brusch, Lars Nielsen, and Jan C. Petersen, Towards an all fibre based optical frequency standard using acetylene-filled hollow-core photonic bandgap fibres, CLEO/EUROPE – EQEC 2011, München, Germany, 22-26 May 2011

+ A. Brusch, N. Kjærgaard, J. Hald, and J.C. Petersen, Cavity ringdown using RF beatnote detection'', Danish Physical Society Annual Meeting, Nyborg, Denmark, 21-22 June 2011

+ Kai Dirscherl, Karsten Fuglsang, Thue Grønhøj Frederiksen, Anne Gry Hemmersam, Morten Krøcks Lykkegaard, Søren Kronmann, Kim René Friborg, Comparison of different types of particle counters with aerosolized polystyrene reference particles, 15th ETH Conference on Combustion Generated Nanoparticles, Zurich, Schwitzerland, 26-29 June 2011

+ Antoni Torras-Rosell, Salvador Barrera-Figueroa, Finn Jacobsen, An investigation of sound fields based on the acousto-optic effect, ICSV18, 18th International Congress on Sound and Vibration, Rio de Janeiro, Brazil, 10–14 July 2011

+ Svava Daviðsdóttir, Juliano Soyama, Stela Canulescu, Kai Dirscherl, Rajan Ambat, Investigation of photo catalytic activity of titanium dioxide deposited on metallic substrates by plasma technique, Microscopy Conference, Kiel, Germany, 28 August – 2 September 2011

+ Salvador Barrera Figueroa, Knud Rasmussen, Antoni Torras Rosell, Finn Jacobsen, Free-field calibration of measurement microphones at high frequencies, INTER-NOISE 2011, Osaka, Japan, 4-7 September 2011

+ Antoni Torras Rosell, Salvador Barrera Figueroa, Finn Jacobsen, Sound field reconstruction based on the acousto-optic effect, INTER-NOISE 2011, Osaka, Japan, 4-7 September 2011

+ Svava Daviðsdóttir, Juliano Soyama, Kai Dirscherl, Stela Canulescu, Jørgen Schou, Rajan Ambat, Investigation of photocatalytic activity of titanium dioxide coating deposited on aluminium alloy substrate by plasma technique, European Corrosion Congress 2011, Stockholm, Sweden, 4 - 8 September 2011

+ J. Hald, J. A. Nwaboh, J. K. Lyngsø, O. Werhahn, and J. C. Petersen, Measurements of CO2 in a multipass cell and in a hollow-core photonic bandgap fibre at 2 µm, Field Laser Applications in Industry and Research (FLAIR), Murnau, Germany, 13-17 September 2011

+ Katarzyna Gurzawska, Rikke Svava,Susanne Syberg, Bodil Jørgensen, Peter Ulvskov, Iben Damager, Kai Dirscherl, Yu Yihua, Kenneth Brian Haugshøj, Leif Højslet Christensen, Klaus Gotfredsen, Niklas Rye Jørgensen, Effect of nanocoating with Rhamnogalacturonan-I on surface properties and osteoblasts response, ASBMR 2011 Annual Meeting, San Diego, USA, 16-20 September 2011

+ J. Garnaes, Size and Mechanical Properties of Nano Particles Measured by Atomic Force Microscopy, Track 3-11 on Nanoparticles, BIT 1st Annual World Congress Nano-S&T 2011, World EXPO Center, Dalian, China, 23-26 October 2011

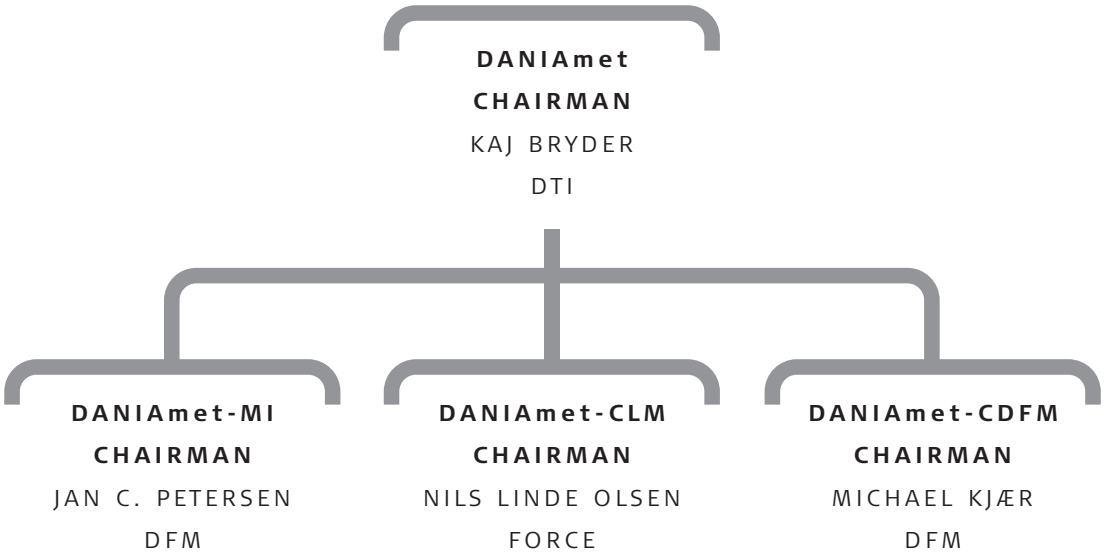
Other talks

+ Hans D. Jensen, Metrologi og måleteknik, DTU Fysik, Lyngby, 6 January 2011
+ Jørgen Garnæs, Mechanical properties of polystyrene nanoparticles, lecture, DTU Polymercenteret, Lyngby, 11 February 2011
+ Kai Dirscherl, Nanometrologi på DFM, DTU Fysik, Lyngby, 21 February 2011
+ Jan C. Petersen, Lasersikkerhed, DFM-kursus, NKT Photonics, Birkerød, 17 March 2011
+ Jørgen Garnæs, Ruhedskursus, NanoPlast meeting, DFM, 18. March 2011, Lyngby
+ Kai Dirscherl, Geometrical metrology and mechanical testing – Atomic Force Microscopy, DTU MEK, Lyngby, 30 March 2011
+ Jørgen Garnæs, Minikursus i nanometrologi, DFM, 26 April 2011
+ Jan Hald, Jørgen Garnæs and Lars Nielsen, Meteren og kilogrammet – før, nu og i fremtiden, Videnskabsfestival, Ringkjøbing Gymnasium, 28 April 2011
+ Kai Dirscherl, Røde aftenhimle – når sollyset spiller bold med nanopartikler, Videnskabsfestival, Hellerup, 28 April 2011
+ Kai Dirscherl, Fra målestok til mikroskop – En historisk rejse gennem flere årtusinde, Videnskabsfestival, København, 28 April 2011
+ Kai Dirscherl, Røde aftenhimle – når sollyset spiller bold med nanopartikler, Videnskabsfestival, Søborg, 29 April 2011
+ Jan C. Petersen, Lasersikkerhed, DFM-Kursus, NKT Photonics, Birkerød, 29 April 2011
+ Jørgen Garnæs, Metrologiens historie, Bestil en forsker, Niels Brock, København, 29 April 2011
+ Kai Dirscherl, Røde aftenhimle – når sollyset spiller bold med nanopartikler, Videnskabsfestival, Brønshøj, 29 April 2011
+ Jan Hald, Jørgen Garnæs and Lars Nielsen, Meteren og kilogrammet – før, nu og i fremtiden, Videnskabsfestival, Herningsholm Gymnasium, 29 April 2011
+ Kai Dirscherl, Fra målestok til mikroskop – En historisk rejse gennem flere årtusinde, Videnskabsfestival, Tølløse, 30 April 2011
+ Hans D. Jensen, Sporbarhed og dokumentation af ultrarent vand, Metrologidagen, Crowne Plaza Konferencecenter, København, 18 May 2011
+ Michael Kjær, Kilogrammets fremtid, København, Metrologidagen, Crowne Plaza Konferencecenter, 18 May 2011
+ Kai Dirscherl, Introduction to metrology, DTU BYG, Lyngby, 10 June 2011
+ Kai Dirscherl, Røde aftenhimle – når sollyset spiller bold med nanopartikler, Videnskabsfestival, Gilleleje, 28 September 2011
+ Jan Hald, Lasers applied for time- and length standards, Department of Physics and Astronomy – Aarhus University, 4 October 2011
+ Jan Hald, Jørgen Garnæs and Lars Nielsen, Meteren og kilogrammet – før, nu og i fremtiden, Kulturnatten, Ministeriet for Forskning, Innovation og Videregående Uddannelser, 14 October, 2011
+ Svava Daviðsdóttir, Kai Dirscherl, Rajan Ambat, Kelvin probe, IPU, Lyngby, 8 November 2011
+ Poul Erik Hansen, Metrologi på målstregen, DFM, 15 November 2011
+ Poul Erik Hansen, Metrologi i industrien, Ibsen Photonics, Farum, 20 November 2011
+ Lars Lundgreen Larsen, Kai Dirscherl, Udfordringer og teknikker i forbindelser med måling af partikler i rene rum, det Nationale Forskningscenter for Arbejdsmiljø, København, 24 November 2011
+ Lars Nielsen, Avanceret usikkerhedsberegning, DFM-kursus, Lyngby, 24-25 November 2011

DANIAmet is an umbrella organization consolidating scientific, applied and legal metrology in Denmark. DANIAmet is constituted by the three organizations DANIAmet-MI, DANIAmet-CLM and DANIAmet-CDFM.

www.DANIAmet.dk

ORGANIZATION OF DANIAmet



DANIAmet-MI is member organization for the seven Metrology Institutes (MI), which have been appointed in Denmark by Sikkerhedsstyrelsen (Danish Safety Technology Authority) for the development and maintenance of primary and reference measurement standards within specified metrological fields.

DANIAmel-CLM is member organization for the Danish players within legal metrology.

DANIAmet-CDFM is member organization for the Danish Metrology Institutes that are members of GTS (Advanced Technology Group).

COLLABORATION ON PRIMARY LABORATORIES

Metrology is divided into subject fields. Within some subject fields more than one Metrology Institute has been appointed. Among some of these institutes, a number of formalised co-operation agreements have been signed under the heading "Danish Primary Laboratory for (subject field)":

DANISH PRIMARY LABORATORY FOR ACOUSTICS (DPLA):
BKSV-DPLA and DFM

DANISH PRIMARY LABORATORY FOR ELECTRICITY (DPLE):
DFM and TRESCAL

DANISH PRIMARY LABORATORY FOR LENGTH (DPLL):
DFM, DTU and TI

BKSV-DPLA
Brüel & Kjær Sound &
Vibration Measurement A/S
Skodsborgvej 307, 2850 Nærum

Contact person for DANIAmet-MI
Torben Licht
Phone: +45 7741 2313
trlicht@bksv.com

Dansk Energi
Rosenørns Allé 9, 1970 Frederiksberg C

Contact person for DANIAmet-CLM
Hans Jørgen Jensen
Phone: +45 3530 0772
hhj@danskenergi.dk

DELTA
DELTA Dansk Elektronik, Lys & Akustik
Venlighedsvej 4, 2970 Hørsholm

Contact person DANIAmet-MI
Anders Bonde Kentved
Phone: +45 7219 4275
abk@delta.dk

Contact person for DANIAmet-CLM and DANIAmet-CDFM
Jørgen Duvald Christensen
Phone: +45 7219 4217
jdc@delta.dk

DFM
Dansk Fundamental Metrologi A/S
Matematiktorvet 307, 2800 Kgs. Lyngby

Contact person for DANIAmet-MI
Jan C. Petersen
Phone: +45 4525 5864
jcp@dfm.dtu.dk

Contact person for DANIAmet-CDFM
Michael Kjær
Phone: +45 4525 5881
mkj@dfm.dtu.dk

DTI
Teknologisk Institut
Kongsvang Allé 29, 8000 Århus C

Contact person for DANIAmet-MI
Jan Nielsen
Phone: +45 7220 1236
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Contact person for DANIAmet-CLM and DANIAmet-CDFM
Kaj Bryder
Phone: +45 7220 1220
kaj.bryder@teknologisk.dk

DTU
Danmarks Tekniske Universitet
Anker Engelundsvej 1, Bygning 101A,
2800 Kgs. Lyngby

Contact person for DANIAmet-MI
Niels Axel Nielsen
Phone: +45 4525 7120
nan@adm.dtu.dk

FORCE
FORCE Technology
Navervej 1, 6600 Vejen

Contact person for DANIAmet-MI, DANIAmet CLM and DANIAmet-CDFM
Nils Linde Olsen
Phone: +45 4326 7498
nlo@force.dk

TRESCAL
Trescal A/S
Mads Clausens Vej 12, 8600 Silkeborg

Contact person for DANIAmet-MI
Torsten Lippert
Phone: +45 8720 6969
torsten.lippert@trescal.com

REFERENCE LABORATORIES OUTSIDE DANIAmet

A number of laboratories outside DANIAmet has been appointed by ministries and governmental agencies as reference laboratory within a specified field of measurement.

DTU AQUA, Danmarks Tekniske Universitet, Institut for Akvatiske Ressourcer
Charlottenlund Slot, Jægersborg Allé 1, 2920 Charlottenlund

Ministry	Ministeriet for Fødevarer, Landbrug og Fiskeri
Field	Food chemistry
Contact person	Jørgen Dalskov
	Phone:+45 3588 3380
	www.aqua.dtu.dk

Institut for Agroøkologi, Aarhus Universitet
Forsøgsvej 1, Flakkebjerg, 4200 Slagelse

Ministry	Ministeriet for Fødevarer, Landbrug og Fiskeri
Field	Environmental chemistry (soil and water)
Contact person	Inge Formsgaard
	Phone: +45 8715 8192
	www.au.dk

DEKS
Herlev Hospital, Herlev Ringvej 75, 2730 Herlev

Ministry	Sundhedsministeriet
Field	Laboratory medicine
Contact person	Inger Plum, 54M1
	Phone: +45 4488 3454
	www.deks.dk

Eurofins Miljø A/S
Ladelundvej 85, 6600 Vejen

Ministry	Miljøministeriet
Field	Environmental chemistry (water, soil, sludge and waste)
Contact person	Ulla Lund
	Phone: +45 7022 4266
	www.eurofins.dk

FORCE Technology, Energi, Klima & Miljø
Park Allé 345, 2605 Brøndby

Ministry	Miljøministeriet
Field	Air emission monitoring
Contact person	Lars Gram
	Phone: +45 4326 7000
	www.force.dk

Institut for Miljøvidenskab, Aarhus Universitet
Frederiksborgvej 399, 4000 Roskilde

Ministry	Miljøministeriet
Field	Ambient air pollution measurement
Contact person	Lone Grundahl
	Phone: +45 8715 4400
	www.dmu.dk

DTU Fødevareinstituttet, Danmarks Tekniske Universitet
Mørkhøj Bygade 19, 2860 Søborg
Ministry Ministeriet for Fødevarer, Landbrug og Fiskeri
Field Food chemistry and food microbiology
Contact person Dorthe Lau Baggesen
Phone: +45 3588 6207
www.food.dtu.dk

DTU Veterinærinstituttet, Danmarks Tekniske Universitet
Bülowsvej 27, 1790 København V
Ministry Ministeriet for Fødevarer, Landbrug og Fiskeri
Field Livestock diseases
Contact person Thomas Krogh Nielsen
Phone: +45 3588 7820
www.vet.dtu.dk

Eurofins Miljø A/S
Ladelundvej 85, 6600 Vejen
Ministry Miljøministeriet
Field Environmental microbiology
Contact person Inger Guldbæk
Phone: +45 2710 5463
www.eurofins.dk

Eurofins Steins Laboratorium A/S
Ladelundsvej 85, 6600 Vejen
Ministry Naturstyrelsen
Field Microbiology
Contact person Inger Guldbæk
Phone: +45 2710 5463
www.eurofins.dk

Fødevarestyrelsen
Søndervang 4, 4100 Ringsted
Ministry Ministeriet for Fødevarer, Landbrug og Fiskeri
Field Food chemistry and environmental chemistry
Contact person Niels Ellermann
Phone: +45 4526 3810
www.foedevarestyrelsen.dk

Statens Seruminstitut
Ørestads Boulevard 5, 2300 København S
Ministry Sundhedsministeriet
Field Microbiology
Contact person Helle Bruhn-Rasmussen
Phone: +45 3268 8103
www.ssi.dk

DELTA, Test & Rådgivning
Venlighedsvej 4, 2970 Hørsholm
Ministry Miljøstyrelsen
Field Noise measurements
Contact person Claus Backalarz
Phone: +45 7219 4600
www.referencelaboratoriet.dk

THE 12 SUBJECT FIELDS OF METROLOGY

Fundamental metrology in Denmark follows the EURAMET division into 12 subject fields, while the subfields reflect metrological activities in Denmark. Plans of action drawn up for each subject field serve as guidelines in the nomination of primary and reference laboratories and give suggestions for other initiatives. The years in which plans of action have been published are shown in parenthesis.

The 12 subject fields of metrology

SUBJECT FIELD	CONTACT PERSON	SUBFIELDS	METROLOGY INSTITUTE
MASS (1989, 1997, 2008)	Lars Nielsen, DFM ln@dfm.dtu.dk	Mass measurement Force and Pressure Volume and Density	DFM FORCE FORCE
ELECTRICITY AND MAGNETISM (1989, 1994, 2002)	Hans Dalsgaard Jensen, DFM hdj@dfm.dtu.dk	DC electricity AC electricity HF electricity	DFM TRESCAL TRESCAL
LENGTH (1989, 1998, 2007)	Jørgen Garnæs, DFM jg@dfm.dtu.dk	Basic length measurements Dimensional metrology Micro/Nano	DFM DTU & DTI DFM
TIME AND FREQUENCY (1992, 2000)	Jan Hald, DFM jha@dfm.dtu.dk	Time measurement Frequency	
THERMOMETRY (1992, 1999, 2007)	Jan Nielsen, DTI jan.Nielsen@teknologisk.dk	Temperature measurement by contact Non-contact temperature measurement Humidity	DTI DTU DELTA
IONISING RADIATION AND RADIOACTIVITY (1992, 2000)	Arne Miller, DTU armi@risoe.dtu.dk	Absorbed radiation dose – Industrial products. Absorbed radiation dose – Medical products Radiation protection Radioactivity	DTU
PHOTOMETRY AND RADIOMETRY (1990, 1996, 2004)	Jan C. Petersen, DFM jcp@dfm.dtu.fk	Optical radiometry Photometry Colorimetry Optical fibres	DFM
FLOW (1990, 1999, 2007)	Nils Linde Olsen, FORCE nlo@force.dk	Gaseous flow (volume) Water flow (volume, mass and energy) Flow of liquids other than water Anemometry	FORCE DTI FORCE
ACOUSTICS, ULTRASOUND AND VIBRATION (1992, 2000, 2009)	Salvador Barrera-Figueroa, DFM sbf@dfm.dtu.dk	Acoustical measurements in gases Acoustical measurements in solids Acoustical measurements in liquids	DFM & BKSV-DPLA BKSV-DPLA
AMOUNT OF SUBSTANCE (1992, 1995, 2004)	Pia Tønnes Jacobsen, DFM ptj@dfm.dtu.dk	Environmental chemistry Laboratory medicine Products and materials Food chemistry Pharmaceutical chemistry Microbiology Electrochemistry	 DFM
INTERDISCIPLINARY METROLOGY	Hans Dalsgaard Jensen, DFM hdj@dfm.dtu.dk	No subdivisions	
QUALITY	Jan Hald, DFM jha@dfm.dtu.dk	No subdivisions	

DETAILS OF PERSONNEL

Board of directors
Lars Barkler, CEO, Lithium Balance A/S
Niels Axel Nielsen, CEO, Technical University of Denmark (Vice Chairman)
René Logie Damkjer, CEO, AgroTech – Institute for Agro Technology and Food Innovation
Steen Konradsen, CEO, Baunehøj Invest ApS (Chairman)
Søren Stjernqvist, CEO, Danish Technological Institute
Kai Dirscherl, MSc (EE), PhD, Staff Scientist, DFM A/S
Jan C. Petersen, PhD, Staff Scientist, DFM A/S

Management
Michael Kjær, CEO, MSc (EE)

Accountants
KPMG, Statsautoriseret Revisionspartnerselskab

Staff
Lars Nielsen, MSc (EE), PhD
Hans Dalsgaard Jensen, MSc (EE), PhD
Jan C. Petersen, PhD
Jørgen Garnæs, MSc, PhD
Peter Høgh, Technician
Jan Hald, MSc, PhD
Isabella Stendal, Administration
Bo Bengtsen, Technician
Salvador Barrera Figueroa, MSc EE), PhD
Pia Tønnes Jakobsen, MSc, PhD
Poul Erik Hansen, MSc, PhD
Kai Dirscherl, MSc (EE), PhD
Pia Krog-Pedersen, Administration
Charlotte I. Falk, MSc, PhD Student
Antoni Torras Rosell, PhD Student
Lasse Kristensen, Key Account Manager
Jørgen Avnskjold, Technician
Anders Brusch, MSc, PhD
Mette Bitz Mikkelsen, Receptionist
Johannes Weirich, MSc, PhD
David Balslev-Clausen, MSc, PhD (from 14 November)

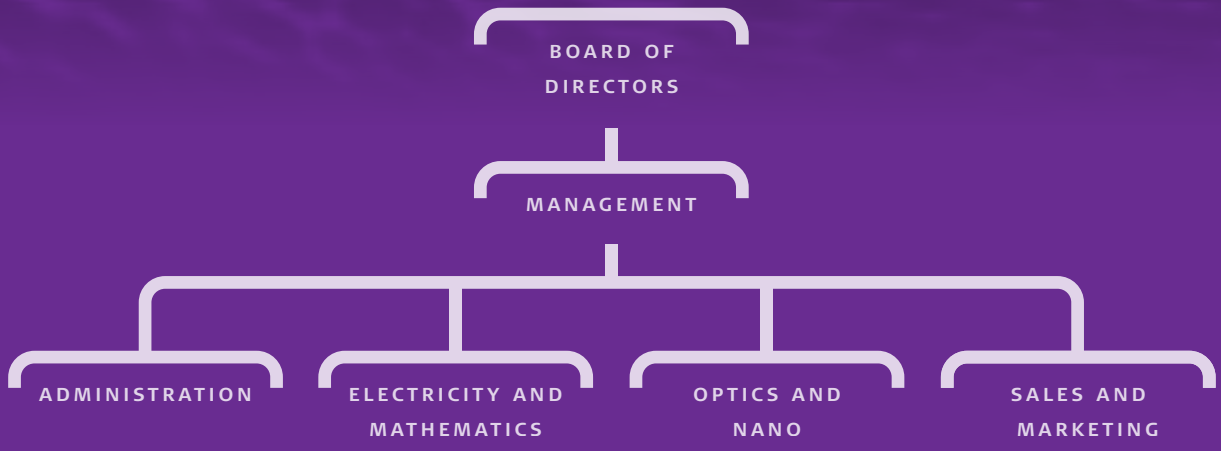
Visitors and students
Katazyna Gurzawska, PhD Student (from 1 May 2011)
Svava Daviðsdóttir, PhD Student (from 1 May 2011)
Anders Simonsen, PhD Student (11 April 2011 – 12 December 2011)
Søren Vinter Søgaard, PhD Student (from 10 October)

KEY FIGURES

Nøgletal i millioner kr.	2007	2008	2009	2010	2011
Nettoomsætning	16,8	16,8	18,1	19,2	20,1
Bruttoresultat	15,0	15,0	16,8	17,3	17,9
Årets resultat [1])	0,2	0,5	-0,3	0,6	1,0
Egenkapital	12,7	13,2	12,9	13,5	14,4
Kommerciel omsætning	3,9	3,0	2,5	2,2	2,7
- heraf små virksomheder (under 50 ansatte)	0,4	0,3	0,3	0,4	0,6
- heraf mellemstore virksomheder (50-250)	0,5	0,6	0,8	0,5	0,5
- heraf store virksomheder (over 250 ansatte)	0,4	0,5	0,4	0,5	0,5
- heraf offentlige danske institutioner	0,1	0,2	0,3	0,2	0,6
- heraf udenlandske virksomheder og institutioner	2,5	1,5	0,7	0,7	0,5
Udenlandsk bruttoomsætning	3,6	2,2	1,4	1,6	0,9
Forskning og Udvikling					
Antal samarbejdsprojekter	8	10	11	10	18
- heraf innovationskonsortier	2	2	2	2	1
- heraf internationale projekter	4	7	4	5	7
Forskning og udvikling omsætning (millioner kr.)	13,6	14,3	15,4	18,6	18,5
- heraf egenfinansieret	0,9	0,6	0,6	1,6	1,2
Forskning og udvikling indsats (årsværk)	8,3	9,4	10,6	11,5	12,3
Antal kunder					
Danske private virksomheder	39	51	44	37	27
- heraf små virksomheder (under 50 ansatte)	9	9	10	19	10
- heraf mellemstore virksomheder (50-250)	13	7	10	6	6
- heraf store virksomheder (over 250 ansatte)	17	17	15	12	11
Offentlige danske institutioner	4	8	9	9	5
Udenlandske virksomheder og institutioner	20	29	22	21	18
Samlet kundemasse	63	80	66	67	50
Antal medarbejdere efter uddannelse (årsværk)					
Dr & PhD	10	10	10	11	11
MSc	3	3	4	4	4
Øvrigt teknisk personale	3	3	3	3	3
Administrativt personale	2	2	2	2	2
Gennemsnitligt antal medarbejdere	18	18	19	20	20
Antal publikationer					
Publikationer med bedømmelse	8	9	5	8	9
Afsluttede PhD – og eksamensprojekter	1	1	0	1	0
Andre rapporter	31	41	24	24	23
Indlæg ved konferencer	16	10	5	11	14
Kalibreringscertifikater og målerapporter	228	285	263	271	442
Presseklip	23	9	16	14	4
Undervisning					
DFM kurser (antal dage)	51	25	9	9	5
DFM kurser (antal deltagere)	215	135	26	22	39
Vejledere/undervisere på universiteter	2	3	2	2	3
Medvejledning/eksamensprojekter (antal) [2])		3	2	5	5
Bidrag til undervisning på universiteter (antal dage) [2])		5	5	4	8
Eksternt fagligt arbejde (antal udvalg)	21	27	30	23	26
- heraf internationalt fagligt arbejde	18	21	20	20	22
Effektivitet					
Omsætning pr. medarbejder (1.000 kr.)	940	928	925	976	999
Overskud pr. medarbejder (1.000 kr.)	10	29	-18	36	49
Kommerciel omsætning pr. resultatkrone	0,4	0,3	0,2	0,2	0,2
FoU-omsætning pr. resultatkrone	0,5	1,2	1,2	1,4	1,3

[1]) Resultatet er eksklusive ekstraordinære poster

[2]) Ny opdeling fra 2008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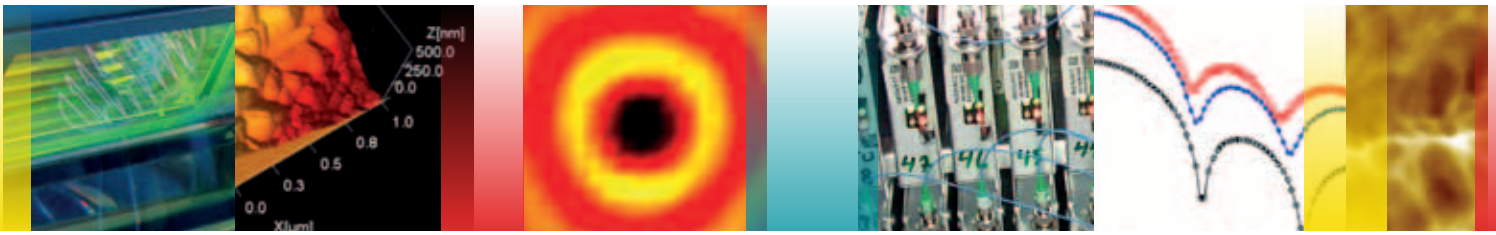

MISSION

To develop and disseminate measurement knowledge at an international scientific level with focus on Danish interests.