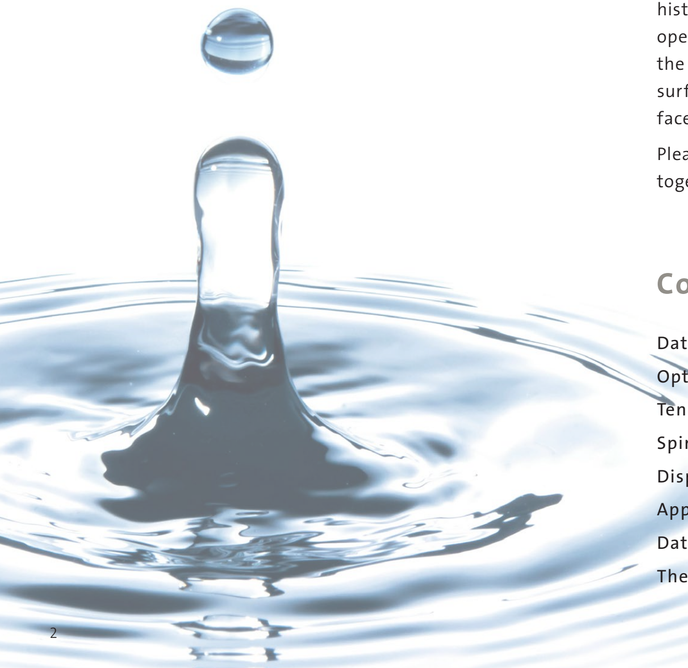
Understanding Interfaces

Where others regard interfaces as a mystery,
we provide clarity.

dataphysics

„God made the bulk,
surfaces were invented
by the devil.“

Wolfgang Pauli (1900–1958)
Nobel laureate in Physics



Dear reader,

Pauli's quote illustrates that the analysis of surfaces and interfaces is quite a challenging task. True to our motto "Understanding interfaces", DataPhysics has been meeting this challenge for the past 20 years and providing researchers in science and industry, around the globe, with highly specialised, application targeted measuring instruments.

So, what can we tell you about DataPhysics as a company? Its history and its dedicated team? How has DataPhysics developed a range of measuring devices, with the fundamentals of the scientific rules and requirements always in mind, to enable surface and interfacial scientists to "look the devil in the face"?

Please take the time to read through this carefully put together brochure to find out!

Content

DataPhysics – a success story

DataPhysics Instruments has established a worldwide reputation for the provision of **high quality and innovative measurement equipment within the field of surface and interfacial science**. With more than 2 500 installations across a diverse range of laboratories, DataPhysics is regarded as a reliable and professional partner, providing specialised products and individual advice. And the customer base continues to grow, year on year.

The **foundations** for this success story were laid in **August 1997** when original shareholders, Dr. Ulrich Busch, Torsten Holz and Horst Rau, started their business, with seven employees, in Filderstadt near Stuttgart, Germany. The **vision of the founders** was clear: they would develop **highly beneficial, trendsetting measuring devices**, sold and supported worldwide, with a highly qualified team of scientists and engineers, working in close cooperation with those investing in the technology. The commitment, enthusiasm, and creativity of the small team meant that after just nine months the first optical contact angle measuring instrument could be introduced at Analytica in 1998 – **a major success**! In the years that have followed the product range has widened with the addition of techniques such as tensiometry, spinning drop tensiometry and dispersion stability analysis. This has established DataPhysics as a **single source provider for measuring devices used in the analysis of surface and interfacial properties**. A continuously growing range of instrument accessories, together with the availability of the company's application laboratory and training centre, provide for the "complete package" when addressing the challenges that interfacial interactions provide.

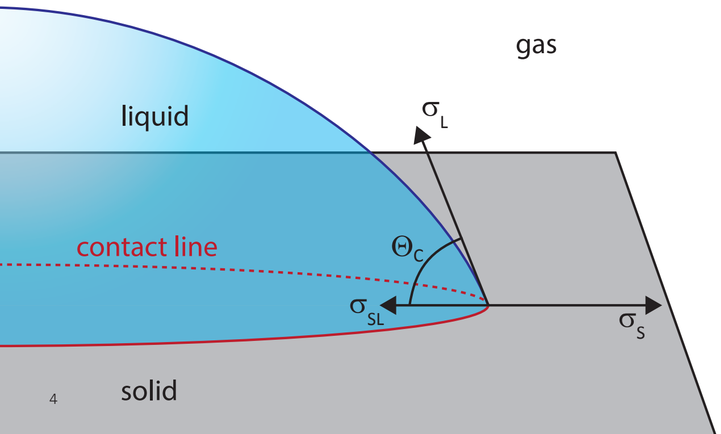
Energetic into the future

Today, 20 years on, DataPhysics has established a **leading position in a very demanding market**, and anticipates an exciting future. Since March 2017, a new executive team has led the company: long time employees **Jens-Ole Wund**, physicist and new product development manager, and **Nils Langer**, engineer and sales director, are now managing partners together with founder **Horst Rau**. All three are eager to continue the DataPhysics success story in the coming years. And they have a strong base on which to move forward.

Optical contact angle measurement

The optical analysis of drops that hang from a dosing needle or are placed on a solid surface facilitates the determination of different surface and interfacial parameters. The **contact angle** that a liquid drop establishes on a solid characterises the solid's **wetting behaviour** with said liquid. Having measured the contact angles of multiple test liquids the **surface energy** of the solid can be determined and the latter can be used to calculate the **work of adhesion** for different liquids.
The reliable and experimentally robust measurement of the contact angle aids on the development of surface coatings, composite materials, paints and varnishes or cleaning agents. In short: the measurement of contact angle helps in all situations where solids and liquids meet and advantage is to be gained by the control of wetting and adhesion properties.

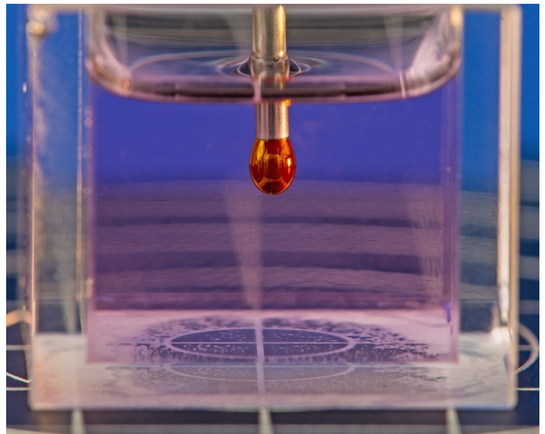
A well quoted example of large contact angles can be found in nature: when water droplets come into contact with a lotus leaf they roll off without wetting the surface. During 'roll off' the drops take dirt particles with them, resulting in the self-cleaning of the leaf. Mimicking this "**Lotus effect**" is a popular research and product development topic in many technical fields. Self-cleaning facades, ceramics and other surfaces are regarded as highly desirable. In this context the ability to measure and record contact angle, of course, plays an essential role.



Wetting behaviour analysis made easy

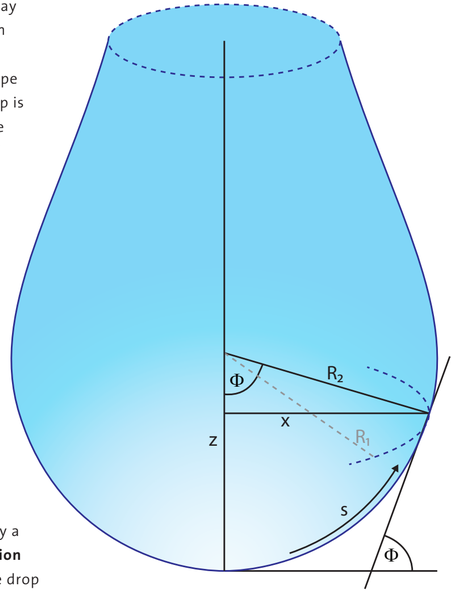
An equilibrium of vectorial forces dictates the contact angle at the three phase contact line of a deposited drop. The surface energy of the solid σ_s acts along the solid surface. The solid-liquid interfacial energy σ_{SL} acts in the opposite direction and the surface tension σ_L of the liquid acts tangential to the drop surface. This can be described by a simple scalar equation:
$\sigma_L \cos\Theta_C = \sigma_S - \sigma_{SL}$ **Young equation**

The drop is viewed in profile during the contact angle measurement. The image processing software recognises and records the drop contour, as well as the base line at the solid-liquid interface, and fits a mathematical function to the drop shape.



and drop contour analysis

When no other factor is in play a drop of liquid tends to form a sphere, due to its surface tension. The typical drop shape materialises because the drop is elongated due to gravity. The **Young-Laplace** evaluation of pendant drops recognises this fact: The characteristic shape of the drop profile yields the **surface tension** σ_L of a liquid.



Get to grips with surface and interfacial tension

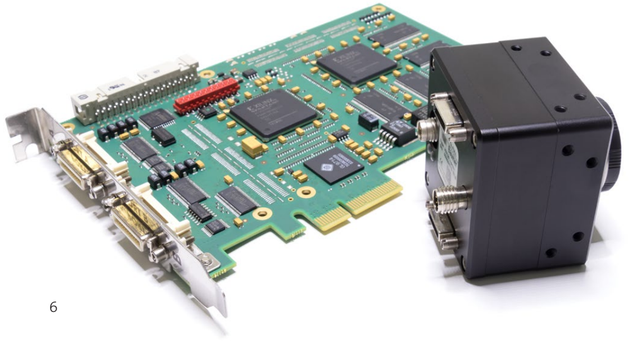
In the case where a pendant drop is surrounded by a second liquid, rather than air, the **interfacial tension** between the two liquids can be deduced from the drop shape.
For optical analysis the outer liquid has to be transparent. Depending on the relative densities, the inner liquid can be dosed either as a pendant drop or upwards, via a bent needle.

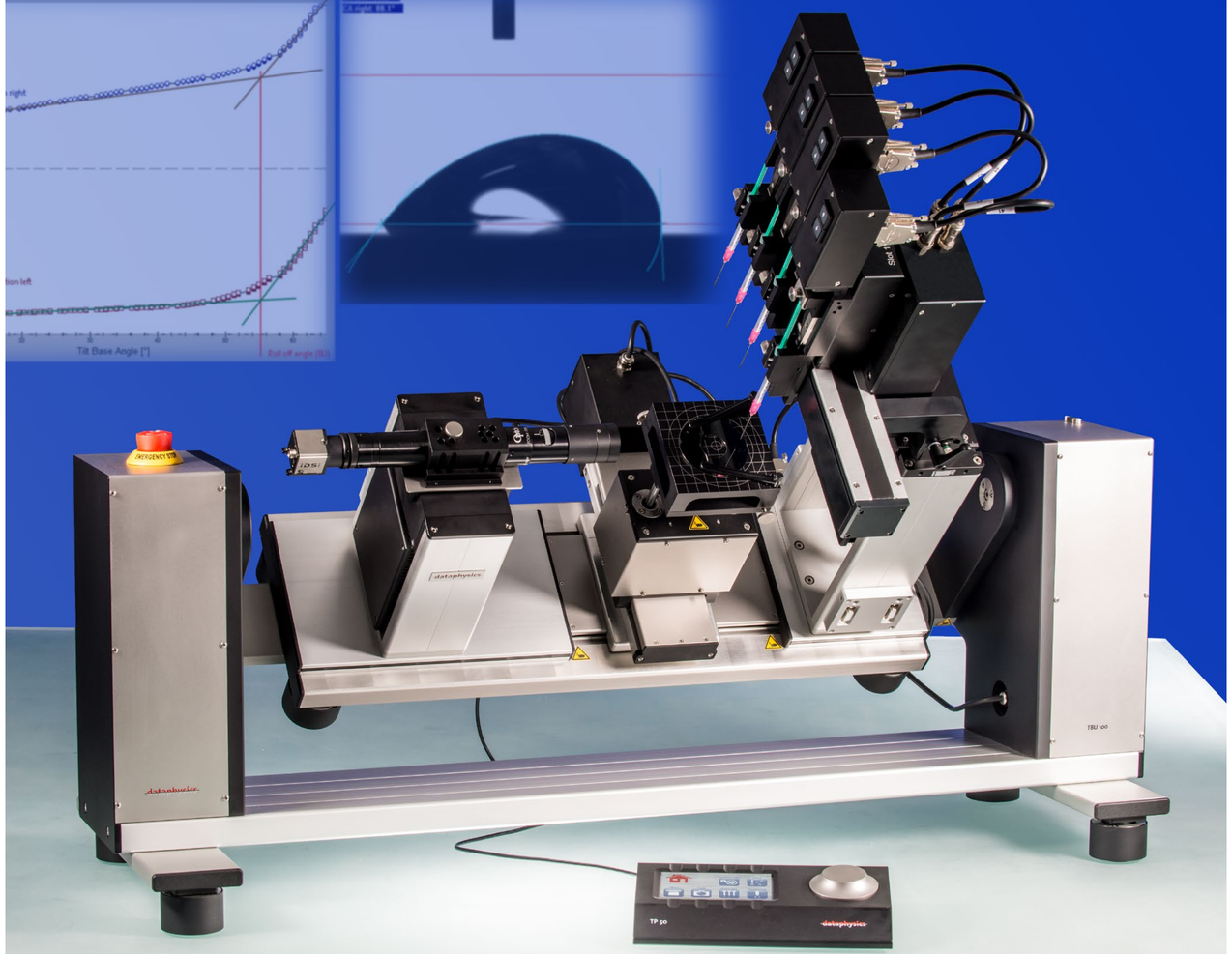
OCA
Optical Contact Angle measuring and contour analysis system

The optical contact angle measuring and contour analysis systems of the **OCA series** combine high resolution **optics**, exact **liquid dosing** and precise **sample positioning** into powerful and reliable measuring systems.
The modular approach to all hardware components and application-specific software means DataPhysics is able to offer a **multitude of configurations**, ranging from manually operated base systems to fully automated high performance measuring systems.

Every drop perfectly dosed

Whether utilising manually adjusted optics or **fully automated optic alignment** – pin sharp drop images are guaranteed with all optic solutions. **Microscope optics** are available to facilitate the study of precisely targeted areas on solid samples and the analysis of even the fastest spreading and adsorption processes succeeds with **high-speed camera systems**.





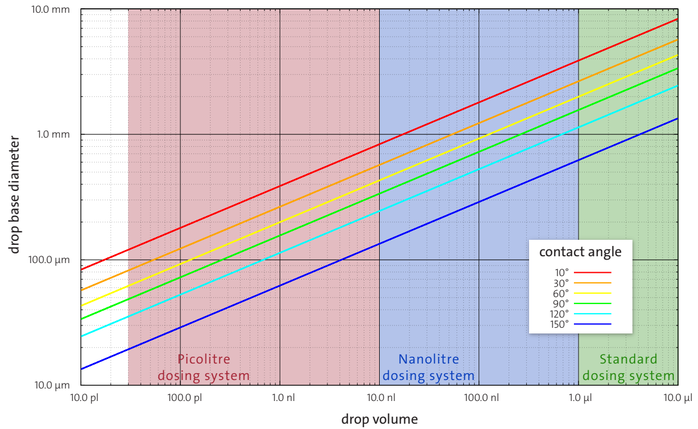
In order to dose drops precisely and reproducibly different **tubeless direct dosing systems** are available. They utilise glass or disposable syringes which provides for short preparation times and minimal cleaning efforts.
This applies to both manually positioned **single syringe modules** and to **multi-dosing systems** with up to four electronically selectable and positioned syringes.
Especially small droplets that are required to analyse micro-structured samples can be created with **special nanolitre or picolitre dosing systems**.

Every sample perfectly positioned

Manual or software-controlled **precision axes** enable the correct positioning of every sample. Special **sample holders** keep them in place while with **device tilting units** even drop ‘roll off’ experiments become effortless.

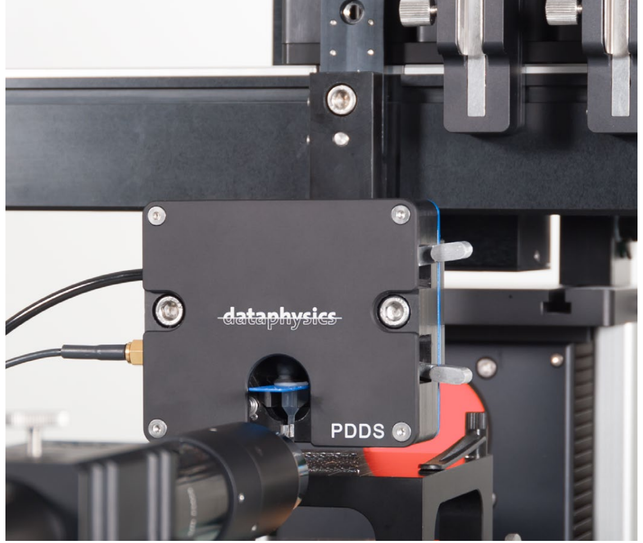
Contact angle measurement on **microstructures**

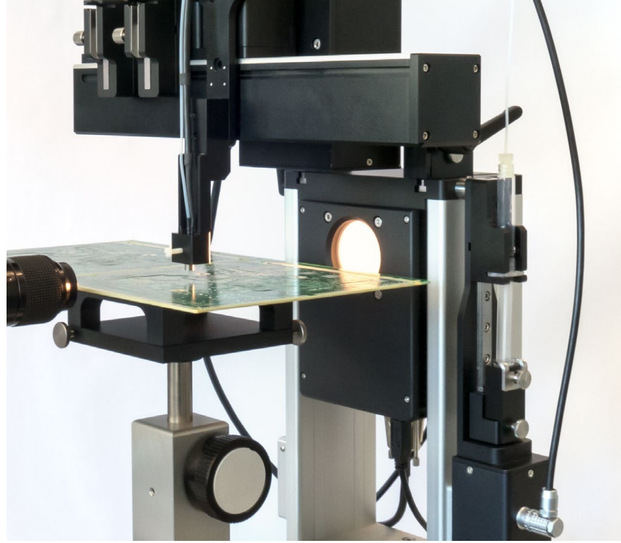
An essential requirement for an accurate contact angle measurement is that the drop does not touch or wet beyond the edge of the test surface. This poses the challenge to dose **especially small drops** when **analysing micro-structured samples** like printed circuit boards, small medical products, lithographic structures, precision mechanics and assembly components, wires and single fibres. That challenge is met by **innovative special dosing systems** from DataPhysics.

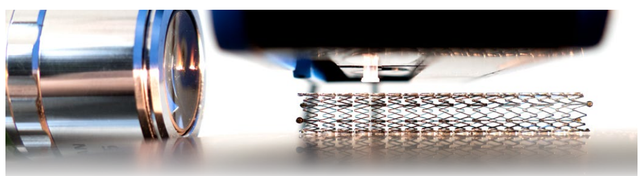


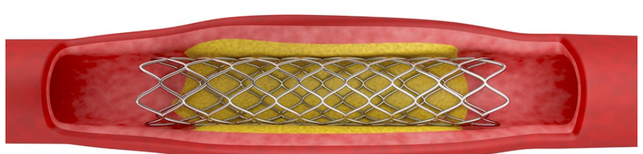
Dosing droplets even on smallest structures

The **microlitre-sized drops** dosed with a **standard dosing system** have base diameters in the millimetre range, depending on the contact angle. This equals about the size of a pin head.
With a **nanolitre dosing system** from DataPhysics droplets down to volumes a hundred times smaller, typically **10 nanolitres**, can be dosed. These drops fit, for example, into the screw threads of a dental implant whose surface is to be investigated.
The mesh structure of a coronary stent presents an even smaller test area. Its surface properties have to be optimised in order to prevent the vessel from being blocked by tissue regeneration. In this case the **picolitre dosing system** is utilised to create drops down to **30 picolitres**.









Special dosing with outstanding features

Standard DataPhysics syringe modules can easily be upgraded to a **nanolitre dosing system** by the addition of a nanolitre dosing valve. Thus contact angle measurements on micro-structured samples become possible with little effort.

A key advantage of the **picolitre dosing system** is the use of **disposable cartridges**. Thus time-consuming **cleaning procedures are not necessary** and **cross-contamination is impossible**. This makes working with even the most challenging formulated liquids, including inks or surfactant solutions, routine.

Control of the **testing environment**

The modular approach to the design of the OCA series and the availability of a wide range of accessories facilitate optical contact angle measurements and drop contour analysis under various environmental conditions. **Temperature**, **humidity** and **pressure** can be set and precisely controlled. This enables the recreation of the most diverse application scenarios and the analysis of samples under ‘real life’ conditions

With different **environmental chambers** temperatures between **-30 °C to 700 °C** can be reached.

The formation of ice on **airplane wings** influences the aerodynamic properties and the stability of the aircraft. In order to guarantee highest levels of comfort and safety, even at freezing cold temperatures, **de-icing fluids** are used extensively. Their wetting behaviour can be investigated at temperatures of down to -30 °C in a suitable environmental chamber from DataPhysics.

Icy or hot — measure at any temperature

Investigating the properties of metals, polymers or hotmelts, in their liquid state, is an appropriate application for the **needle heating device**. This special development facilitates the dosing of **molten solids** at up to **700 °C**. Hence the surface tension of, for example, molten aluminium can be determined.

Moss or mould on a **facade** is an unsightly problem that occurs as a result of high and long-lasting surface humidity.
In order to investigate which surface properties lead to or promote the fastest drying under high humidity, the conditions that prevail during the formation of morning dew can be simulated with a **humidity generator** of the **HGC series**.

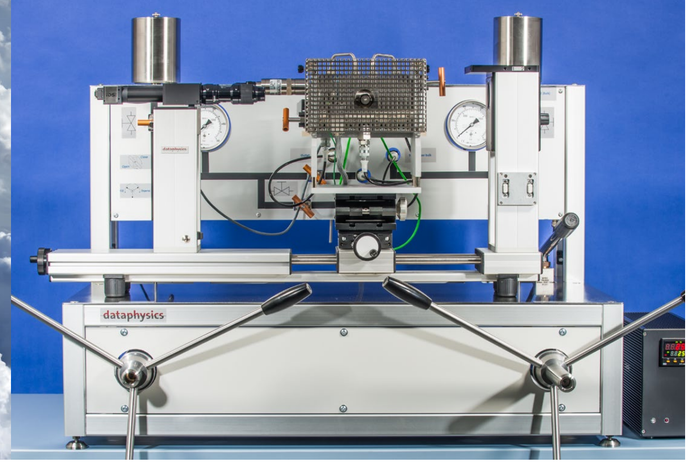
From Sahara desert to tropical rainforest — humidity from any climate zone

The **humidity generators of the HGC series** allow for a reliable control of the **relative humidity**, in the range of **5 % to 90 %**, inside environmental chambers from DataPhysics or other suppliers. Due to the integrated touch screen the system can be operated without additional software and is directly ready for use. Of course, the software of the DataPhysics measuring instruments includes, integrated, HGC humidity control.

High temperature and vacuum

The **special models** of the OCA measuring systems satisfy even the highest customer expectations and cope with the most challenging measuring environments.

Inside the **high temperature furnace** from DataPhysics contact angle measurements at up to **1800 °C** and under vacuum down to **10^{-5} mbar**, or inert gas atmosphere, are possible.



...or high pressure

Inside the **high pressure chamber** from DataPhysics interfacial tensions and contact angles can be measured at pressures of up to **750 bar** and under high temperature conditions of up to **200 °C**.

Correct measuring results under high pressure

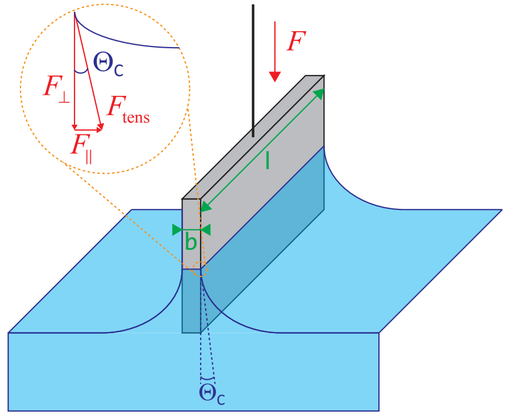
Shoot for the stars with special solutions from DataPhysics

Materials used in **aerospace engineering** have to endure extreme stress. The heat shield of a space craft, for example, has to withstand up to several thousand degree Celsius during re-entry into earth's atmosphere.
In this case, for instance, **ceramic fibre composites** are being used. Their surface properties can be investigated inside a high temperature furnace in order to optimise them for these extreme environmental conditions.

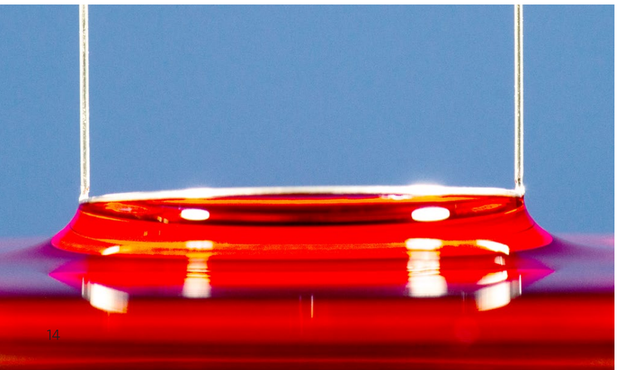
Due to the shortage of fossil fuel resources and the general increase in extraction costs, **enhanced oil recovery (EOR)** methods are being used to access **crude oil** from less forgiving materials, such as oil shale. One EOR method "washes" the oil out by pumping surfactant solutions, under high pressure, into the oil reservoir.
The OCA special model with high pressure chamber presents the ideal solution to investigate the interfacial tension between surfactant solution and crude oil or the contact angle between rock, oil and surfactant solution under **reservoir conditions**.

Tensiometry

Surface tension acts to contract and minimise any liquid surface. If a surface is being enlarged by the formation of a **liquid lamella**, as a **test body**, such as a **Wilhelmy plate** or **Du Nouy ring**, is in contact with it, the surface tension exerts a **tensile force** that can be measured. Within a tensiometer this force is measured by a high precision weighing system and, hence, the **surface tension** of the liquid can be calculated.
Using a tensiometer, also the **interfacial tension** between two liquids can be measured with the help of a test body. Since tensiometry is based on **force measurements** it is – in contrast to the optical analysis of pendant drops – not necessary that one of the liquids is transparent or that the refractive index differs between the two liquids. Therefore, tensiometry is in many cases a handy alternative to the optical measurement of surface and interfacial tensions.



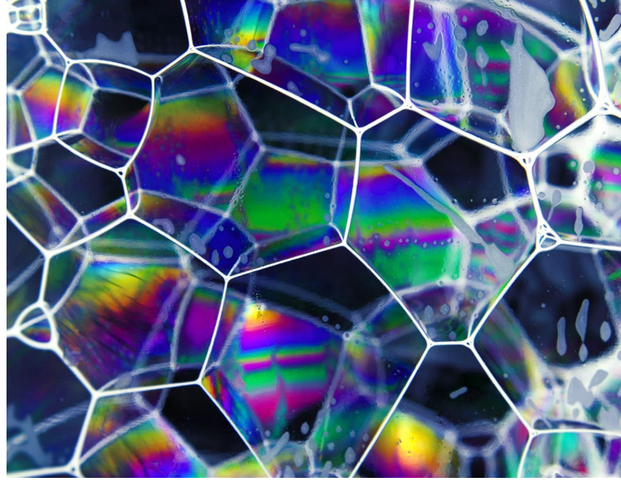
Measure surface forces

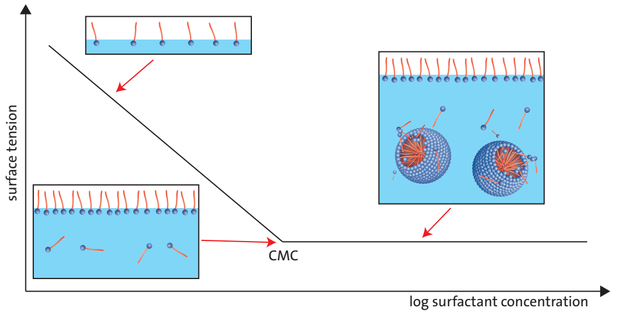


The **Wilhelmy plate method** is a well-established method for determining surface and interfacial tensions with a tensiometer. The method utilises a Wilhelmy plate as the test body. It is typically made of iridium–platinum and is a few centimetres in length and height. The plate is attached to the weighing system of the tensiometer and positioned at the liquid surface in such a way that a liquid lamella forms. The gravitational force of the lamella, which equals the perpendicular part of the tensile force caused by the surface tension, is measured. Together with the definition of the surface tension as tensile force per length of the contact line this yields:

$$\sigma = \frac{F_{\text{tens}}}{L} = \frac{F_{\perp}}{L \cdot \cos\Theta_C} = \frac{F_G}{L \cdot \cos\Theta_C}$$ **Wilhelmy equation**

Interfacially active compounds like **surfactants** consist of a hydrophilic and a hydrophobic part, hence they adsorb preferably at interfaces. There they reduce the surface or interfacial tension, respectively, which is essential for good washing performance or the stability of foams.
The amount of surfactant molecules that can be accommodated on a certain surface area is limited. The only possibility for ‘excess’ surfactant molecules to shield their hydrophobic parts from water is by forming **micelles**. The characteristic surfactant concentration that, when reached, initiates the formation of micelles is called “**critical micelle concentration” (CMC)**. It can easily be determined with a measurement series that varies the surfactant concentration: below the CMC the surface tension decreases with increasing concentration because more and more surfactant molecules adsorb at the surface. Above the CMC, further added surfactant serves only to form micelles and the surface tension stays constant.



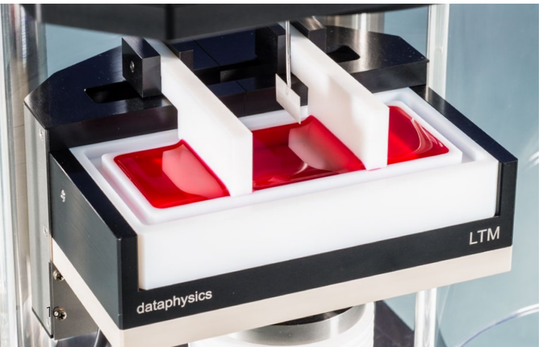


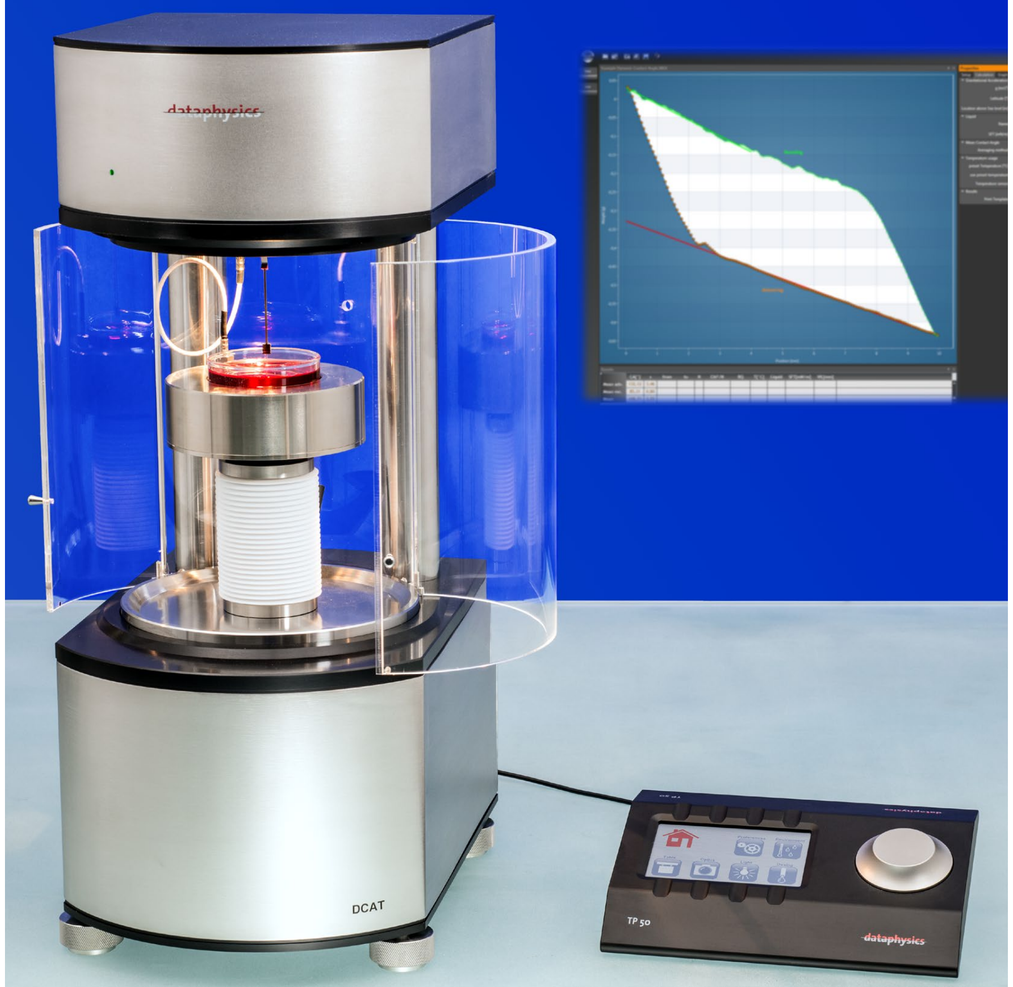
With tensiometry it is also possible to investigate the wetting of and **dynamic contact angles** on solid samples that are used as the test body. For this purpose the sample is dipped into a liquid with known surface tension and pulled back out again. In this case the weighing system detects both the buoyancy of the body and the lamella weight. During evaluation the buoyancy contribution is removed from the data so that the **advancing angle** can be determined for the immersion and the **receding angle** for the withdrawal based on the Wilhelmy equation. In addition, the advancing contact angle of **powders and fibre bundles** can be determined by the **Washburn method**.

DCAT
Dynamic Contact Angle measuring device and Tensiometer

The dynamic contact angle measuring instruments and tensiometers of the **DCAT series** are multi-functional instruments for the force-based measurement of surface and interfacial tensions, advancing and receding contact angles, as well as solid and liquid densities, sedimentation and penetration, adhesion and surface pressure. A wide range of **test bodies and sample holders** as well as specific **upgrade modules** are available for the different measuring methods. Based on a well-established and accepted measuring technique and utilising state-of-the-art weighing technology, the highest precision and reproducibility of the measured results is guaranteed.

With the **Langmuir Trough** module it is possible to analyse **monolayers**, for example of phospholipids, on the surface of liquid subphases, with varying surface area. **Surface pressure** is calculated, based on the measurement of surface tension. Hence, for example, the behaviour of biomembranes like cell walls and alveoli can be mimicked.



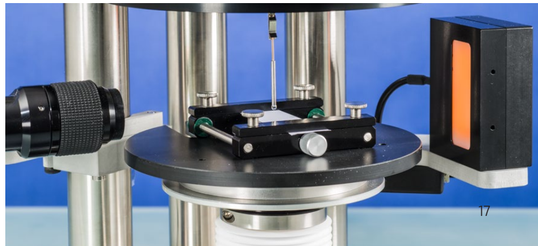


An **automatic, software-controlled liquid dosing and refill unit** can be used to create **sequential concentration series** of, for example, surfactant solutions. Hence, with a special software module the critical micelle concentration (**CMC**) can be determined in a series of experiments during which no manual user intervention is required.

Accessories for every task

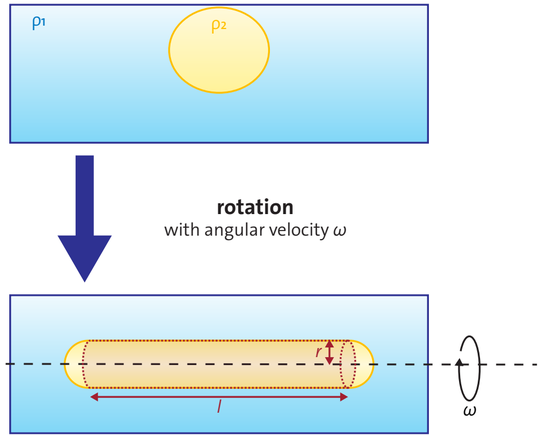
DataPhysics offers a wide selection of **standard test bodies** (Wilhelmy plates, Du Noüy rings), **special measuring bodies** and **sample holders** for plates, foils, fibres, powders, as well as magnetic and textile materials. Hence the most appropriate accessory even for the most demanding measurement is always available.

DCAT systems can be upgraded with a **video module** in order to visualise measuring procedures. This is especially suitable for **adhesion measurements**, where the video image is directly correlated to the measured force and contact angles etc. can be analysed.



Spinning Drop Tensiometry

Spinning drop tensiometry is the technology of choice for measuring extremely small interfacial tensions. The method is based on the **optical contour analysis of a drop**. This drop, instead of hanging from a dosing needle and being exposed to gravitation, is located inside of a **rotating capillary**.
Inside of the capillary the centrifugal force pushes the denser liquid surrounding the drop outwards while the less dense drop gets pushed towards the rotational axis. Hence the drop is **deformed cylindrically** and its interfacial area increases. The **interfacial tension** counteracts this area increase and thus can be determined by analysing the equilibrium drop shape.



Measure the smallest of interfacial tensions

An easy and established evaluation method for strongly elongated drops is the interfacial tension calculation by Vonnegut.

$$\sigma = \frac{\Delta\rho R^3\omega^2}{4}$$ **Vonnegut equation**

Here the shape that the drop adopts at rotation with the angular velocity ω is approximated by a cylinder. The cylinder has a rotational energy that decreases with decreasing radius, which compensates the increase in interfacial energy due to increasing elongation and interfacial area. In the equilibrium state an energy minimum is reached.

"Ultra-low" interfacial tensions occur particularly in **microemulsions** which are used, for example, in **enhanced oil recovery**. At suitable conditions microemulsions form spontaneously from water, oil and surfactant. Hence the oil can be extracted from the reservoir as part of the thermodynamically stable microemulsion system. Interfacial tension measurements by spinning drop tensiometry are an essential tool in the research of appropriate surfactants and mixture compositions.

With spinning drop tensiometry it is also possible to analyse how an interface reacts when its area is enlarged or reduced (**interfacial rheology**). For example, how fast can surfactants from the bulk adsorb at the interface in order to stabilise a newly formed emulsion? To investigate such questions the **rotational velocity is varied** in a spinning drop experiment, typically in an oscillating manner, which directly results in a change of size of the interfacial area.

SVT
Spinning drop Video Tensiometer

The Spinning drop video tensiometers of the **SVT series** are compact optical measuring instruments for the determination of low to ultra-low interfacial tensions and rheological interface properties. Powerful device components like **automated camera positioning**, a **precision drive** and **temperature-controlled measuring chambers** guarantee accurate and reproducible measurement results. Convenient **fast-exchange capillaries** and an intuitive control via **touch screen** ensure flexible sample handling and easy operation.

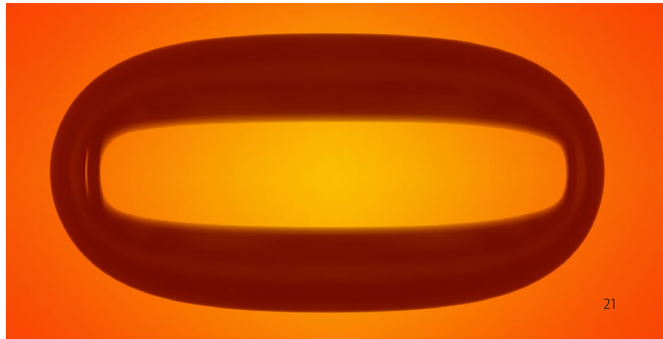
Precise measuring technique in a compact package

For an efficient measuring procedure the measuring cell, with the rotating capillary, is mounted on a **tilting table**, which allows the operator to easily move the drop of interest into the camera view. Once detected the drop is automatically tracked by the movable camera. A highly dynamic measurement drive creates a **uniform rotation** even at highest rotational velocities. In addition it allows for sinusoidal changes in revolution speed for **oscillation measurements** and for rapid **rotational velocity steps**.

Samples can be easily placed inside the SVT, within seconds, due to **fast-exchange capillaries** with perfect fitting accuracy. Hence the highest throughput rates can be assured. In order to avoid extensive cleaning procedures **disposable glass tubes** with corresponding holders can also be used for the measurement.

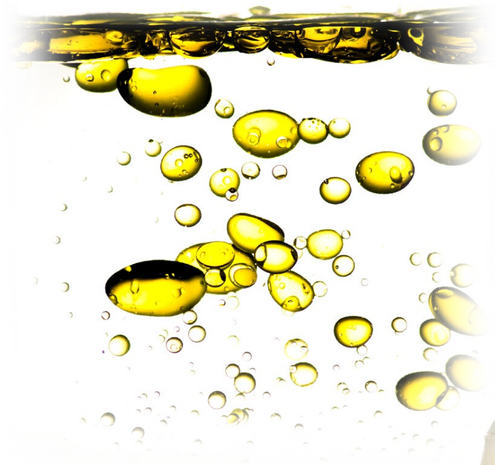
Fast, simple, powerful

Temperatures within the range of **-30 °C to 180 °C** can be reached inside the SVT **measuring chambers**. This facilitates the recreation of many different environmental conditions. It is even possible to investigate the interfacial behaviour of aqueous samples at temperatures above 100 °C due to a special design of the capillaries.

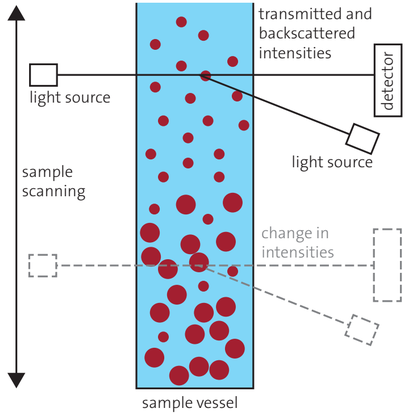


Dispersion stability analysis

Dispersions are multi-phase mixtures consisting of substances that are insoluble in one another. One phase is the continuous phase in which small particles of the other phase are dispersed. A **suspension** consists of a liquid continuous phase and dispersed solid particles. In an **emulsion** the dispersed particles are small droplets of another liquid, and a **foam** consists of a liquid continuous phase and dispersed gas bubbles.
Over time destabilisation processes take place inside dispersions: the dispersed particles can **sediment** or **cream** due to gravity. Moreover phase separation occurs because of the interfacial tension: the dispersed particles **cluster** or **merge** in order to minimise their interfacial area to the surrounding continuous phase.



The **dispersion stability analysis** utilises an optical measuring procedure: with two light sources and a detector, the light **transmitted** through and **scattered back** by the dispersion sample is analysed. The transmission and backscattering intensities directly depend on the number, size and type of dispersed particles. Hence the light intensity changes while the dispersion destabilises and, for example, particles disappear from the light path due to sedimentation or become bigger due to clustering. Stability analysis tracks these changes by measuring the sample again and again for a certain experiment duration. During the measurement the whole sample height is scanned, hence also local changes in the sample are detected.



Sample scanning – time and position resolved

Stable mixture — but for how long?

Dispersions are encountered in everyday life in many different products, ranging from salad dressings and cocktails in the food sector, emulsions and creams in cosmetic and pharmaceutical products to multi-phased cleaning agents, emulsion paint or seal slurry in the building industry, to name just a few examples.
For all these products the dispersion stability is an extremely important factor that has to be analysed and optimised during product development.

Beer, as is well known, differs by amount of alcohol, recipe and taste. However, a mindful observer might also notice different dispersion behaviour as there are brands that have smaller or larger **foam heads** with smaller or larger gas bubbles that are stable for a longer or shorter period of time. In unfiltered beer the **suspended particles** that are responsible for the inherent turbidity sediment over time. And anyone who takes a close look at a famous Irish beer notes that gas bubbles sediment at the glass instead of rising as usual. This effect is caused by the unique combination of distinct glass shape and mixture of nitrogen and carbon dioxide.

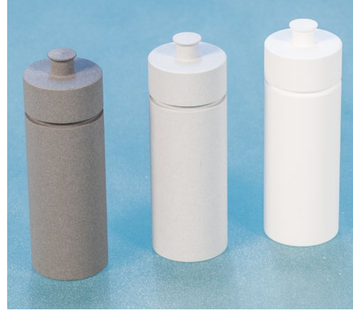
MS MultiScan

The **MultiScan MS 20** is the measuring device for the automatic **optical stability and aging analysis of liquid dispersions**, in particular suspensions and emulsions, and the comprehensive characterisation of time- and temperature-dependent destabilisation mechanisms.
It consists of a **base unit** and **up to six** connected **ScanTowers** with temperature-controlled sample chambers.

Six samples, one device

The **ScanTowers** of the MS 20 can be **individually controlled** and operated at different temperatures. Electric heating, with liquid counter cooling, allows for measurements in a temperature range of **4 °C to 80 °C**.

The MS 20 uses screw cap glasses with a special cap as **sample containers** for easy insertion into the measuring chambers of the ScanTowers. For transmission measurements with reduced sample layer thickness vessels with smaller diameter and corresponding adapters are available.



Reference bodies made of special reflectivity standard materials are used to calibrate the back scattering signal and guarantee correct and reliable measuring values.

Transmission and backscattering with every scan

The **base unit** of the MS 20 features an integrated touch screen that displays status information and can be used to control important base functions. Additionally it is possible to register the studied samples, fast and conveniently, with the built-in **bar code scanner**.

Application and training centre

DataPhysics runs a modern **training centre** and an extensively equipped **application lab** at its head office in Filderstadt near Stuttgart, Germany. Thus, interested persons and established customers have the opportunity to expand their knowledge and experience with advice from experienced DataPhysics product specialists. The dedicated staff are keen to share their knowledge of the **theory and practice**, **fundamentals and special applications** of the different measuring techniques like optical contact angle measurement and drop contour analysis, tensiometry, spinning drop tensiometry and dispersion stability analysis.

Every year a large number of scientists visit the application centre in Filderstadt for one or several **measuring days**, in order to receive help in dealing with their individual challenges. Here the very best instrumental solution with the most appropriate accessories is available. The necessary experiments are carefully planned and carried out together with the DataPhysics experts. The routines are adjusted flexibly and optimised according to the measuring needs. Hence effective, reliable and robust solutions are guaranteed.
In addition, also **contract measurements** are carried out with all measuring instruments. Within shortest time, the customer recieves clearly presented results of measuring techniques that may not be currently available in his own laboratories or that can be used to compare and verify his own measuring data.

Regularly theoretical and practical based **seminars** and **training days** are held in the DataPhysics training centre. The seminars provide the participants with a compact overview of the different methods and measuring techniques that are used for interfacial analysis while training days focus on a special measuring technique.
These offerings allow for a fast and successful start into working with interfacial measuring techniques. On the other hand experienced users benefit from having a look “beyond their current demands”, getting to know new developments and alternative methods, and discussing their current procedures with skilled experts.

Learn from experts — become an expert

For anybody who prefers an **exclusive seminar** – either at the DataPhysics training centre or their own site – a tailor-made agenda is developed according to their needs.

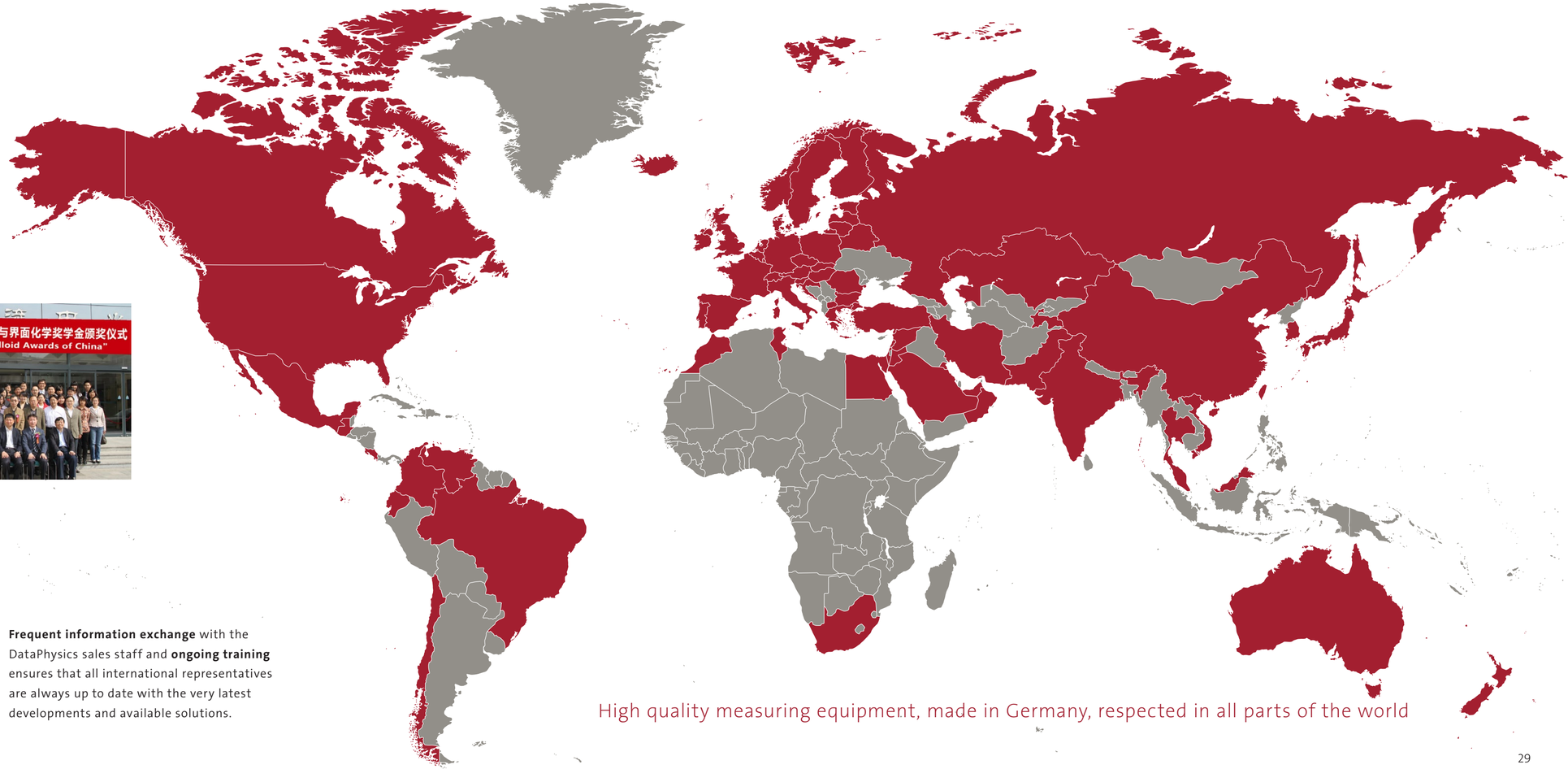
An individual practical **device training** is best suited to get familiar with the functions and possibilities of a newly acquired or long unused measuring device. In this case all involved colleagues can be around and their own samples are directly used for tests and demonstration.

DataPhysics worldwide

DataPhysics is synonymous with the highest **quality and expertise in surface and interfacial measuring systems “made in Germany”**. The DataPhysics measuring devices are developed and produced in the placid city of Filderstadt close to Stuttgart, Germany. They have a worldwide presence, being appreciated in **more than 70 countries** already.
A fast and competent response to all sales, support and service requirements for every customer is assured by a dense **worldwide distribution network**, through which DataPhysics is active globally and represented locally at all times.

In **China** the DataPhysics representative EDIC annually **awards a price to outstanding students** in the field of colloidal chemistry.

Frequent information exchange with the DataPhysics sales staff and **ongoing training** ensures that all international representatives are always up to date with the very latest developments and available solutions.



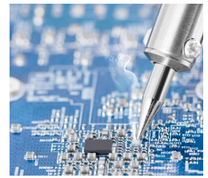
High quality measuring equipment, made in Germany, respected in all parts of the world

The DataPhysics team

What started in 1997 with a small team of just **seven visionaries**, developed in 20 years into a strong, skilled and continuously growing **team of experts for surface and interfacial measuring techniques**. Today more than 30 highly qualified and dedicated staff members develop, produce and sell the highest quality measuring systems and assure the very best support for all installed devices. Everyone brings their **individual strength** and **specific expertise** to the table and increases the DataPhysics treasure trove of experience with every finished project. The highest levels of **motivation**, **innovative spirit** and **creativity** are ever-present, providing the very best possible solution for even the most challenging tasks.

The experts for interfacial measuring techniques

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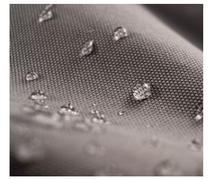
Strong partner
in all fields







Today DataPhysics already stands alongside more than 2 500 satisfied customers worldwide as a respected partner in surface and interfacial measurement and is involved in many cooperation projects with both industrial companies and research institutions. Be the next to profit from the established experience and know-how of the measuring technique experts and benefit from the solutions proposed for your individual challenges.

Just contact us!

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Understanding Interfaces

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