Transcript INP Image Film

Located directly on the Baltic Sea, the Leibniz Institute for Plasma Science and Technology works on innovations for industry and everyday life. The institute conducts application-oriented basic research from the initial idea to the prototype. INP Greifswald is one of the world's leading research institutions in the field of low-temperature plasmas.

But what exactly is plasma? Most of the time, the matter around us is solid, liquid or gaseous. When enough energy is added to a gas, it begins to glow, creating the fourth state of matter: plasma. We are all familiar with it, but often without realising it. A large part of the universe is in a plasma state. Natural plasmas include our sun, the northern lights and lightning.

The INP researches plasmas in the laboratory at temperatures below 100,000°C, such as those used in welding. Some plasmas are even so cold that they can be applied to the skin. The range of applications is equally broad. Our interdisciplinary team of young and experienced scientists is currently researching and developing processes for surface treatment, disinfection of food, exhaust air or water, and even applications in the healthcare sector. In our high-current laboratory, we use modelling and simulation to investigate phenomena that occur during switching operations, such as the arcing that occurs in medium- and high-voltage switches. The aim is to improve energy efficiency, process reliability and extend the service life of equipment.

The INP is working together with partners from industry and science to expand the energy network of tomorrow. Plasmas are already an indispensable tool in almost all industrial and technological areas today.

Thanks to state-of-the-art equipment, the INP can clean, sterilise, activate, etch, coat and functionalise the surfaces of a wide variety of materials. To this end, we work with partners from the automotive, shipbuilding and aircraft construction industries, medical technology, electronics and textiles. Starting with solar energy generation and fuel cells, through thermal insulation and self-cleaning glass, to precision optics. The INP develops intelligent plasma-based technologies for polishing, deburring and refining surfaces and materials. Or for the controlled coating and functionalisation of medical products, for example, using low-pressure vacuum processes or atmospheric pressure processes such as plasma spraying.

In the field of environment and health, the INP is working on solutions to major issues of our time, such as removing pollutants, odours or germs from exhaust air. Sterilising food. Or removing biologically difficult-to-degrade compounds from water.

When plasma is at room temperature, completely new fields of application open up. Clinical studies have shown that cold plasma can heal. It supports natural wound healing and effectively kills pathogens and even multi-resistant bacteria. The INP has developed the world's first plasma pen approved as a medical device, called kINPen med, which is already being used successfully in wound treatment.

Our successful transfer model opens up new business opportunities for our employees and investors. INP spin-offs are active in the manufacture of equipment for industrial applications, the development and distribution of medical devices, and the fields of optical

metrology, as well as in the transfer of coating and etching processes into practical applications.

At INP, we are constantly taking on new challenges in innovative industrial processes, but also in new areas of medicine, such as cancer therapy. Our partners benefit from our state-of-the-art laboratory technology and a unique range of methods. The scientific expertise of our researchers is at the highest international level. This gives the INP the creative space to explore innovative areas of application with our partners and translate them into marketable solutions. This will continue to drive us forward at the Leibniz Institute for Plasma Science and Technology. From idea to prototype.