

# PRESS RELEASE

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PRESS RELEASE

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## ELLI 300 – An innovative design for electron-beam treatment of liquids

**The Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP has acquired extensive know-how in the field of electron-beam technology over many years. As a result, processes and equipment have been designed and implemented for a wide variety of applications, such as for seed dressing, and for cross-linking and curing of paints. Now a new design for the treatment of liquids is being presented: the ELLI 300 system (ELection treatment of LIquids).**

Electrons – when carefully controlled – can be helpful in many areas of industry. They can be precisely accelerated so that their penetration depth in specific media can be exactly set. The scientists at the Fraunhofer FEP have now utilized their extensive experience to treat even small quantities of liquids effectively using electrons in compact systems. The initial idea was to thoroughly but gently inactivate viruses and bacteria for faster and less expensive production of inactivated liquid vaccines, while preserving as high a quantity of biological signalling components as possible.

The ELVIRA project funded by the Fraunhofer-Gesellschaft developed the basic principles for this through collaboration of the Fraunhofer Institutes IZI, IPA, and IGB. Initial functional tests quickly showed astonishing success. Various bacteria and viruses were successfully inactivated in the laboratory. However, the amount of liquid that can be treated at the laboratory scale is limited to a few milliliters.

In order to make the technique suitable for industrial use, a module for continuous liquid treatment was developed at the Fraunhofer Institute for Manufacturing Engineering and Automation IPA and integrated into an irradiation chamber. Pathogens can be treated in this chamber in a controlled manner using the required dose to develop tailor-made vaccines against various infectious diseases. The project was funded by the Bill and Melinda Gates Foundation.

The equipment for this purpose was successfully installed and commissioned in a BSL-2 laboratory at the Fraunhofer Institute for Cell Therapy and Immunology IZI. Pathogens such as polio viruses can be inactivated in this kind of laboratory with a high level of safety.

Dr. Jessy Schönfelder, project manager at Fraunhofer FEP, describes the new system as follows: “Our ELLI 300 offers an electron-beam source with an electron energy level of up to 300 keV. Liquids can be treated automatically at a throughput of 0.5–5 liters per hour in this new facility to achieve successful and homogeneous inactivation. It is a flexible tool for the next steps of development with industrial customers and research partners.”

With its development of the automated processing module, Fraunhofer IPA has contributed a technology for inactivation that can be easily scaled up and transferred to industry. Not only can this process be used to treat larger quantities of liquids, but it has also brought safe handling of biological liquids up to an industrial level.

The process was nominated as one of the 3 finalists for the ATOMEXPO Award in “Nuclear Technologies for Better Life” at ATOMEXPO 2018 in Sochi (Russian Federation).

The ELLI 300 facility offers numerous new opportunities for cooperation with industry in the form of joint research projects or research contracts. The application of the technology is not limited to the field of vaccine production – other applications are also conceivable, such as the sterilization of biological specimens or other liquid biological materials.



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The **Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP** works on innovative solutions in the fields of vacuum coating, surface treatment as well as organic semiconductors. The core competences electron beam technology, sputtering and plasma-activated deposition, high-rate PECVD as well as technologies for the organic electronics and IC/system design provide a basis for these activities. Thus, Fraunhofer FEP offers a wide range of possibilities for research, development and pilot production, especially for the processing, sterilization, structuring and refining of surfaces as well as OLED microdisplays, organic and inorganic sensors, optical filters and flexible OLED lighting. Our aim is to seize the innovation potential of the electron beam, plasma technology and organic electronics for new production processes and devices and to make it available for our customers.