University of Cologne Spin-Out PoLightFilters Secures €1.1 Million to Revolutionize Optical Filtering Technology

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PoLightFilters, a start-up project originating from the University of Cologne, has secured €1.1 million in funding from the EXIST-FT programme of the Federal Ministry for Economic Affairs and Climate Action (BMWK). The funding will propel the commercialization of a groundbreaking light filtering technology developed by a research team at the Humboldt Centre for Nano- and Biophotonics. This novel technology significantly reduces optical noise and promises to set new benchmarks in thin-film optics, opening up diverse applications across photonics, sensors, optical imaging, and display technology through the utilization of thin-film polaritons.

The research team behind PoLightFilters includes Dr Florian Le Roux, Dr Andreas Mischok, BSc Elena von der Heyden, and Humboldt Professor Malte Gather. Professor Dr Joybrato Mukherjee, Rector of the University of Cologne, commented, “I extend my congratulations to the researchers on their success. This funding underscores the high caliber of future-focused research and innovative technologies emerging from our university.”

A key challenge with conventional optical filters is the degradation of performance at varying light angles, leading to color shifts in displays and restricted fields of view for sensors. PoLightFilters’ innovative technology overcomes this limitation by leveraging the quantum mechanical interaction of light with electronically excited states in thin organic layers, resulting in exceptional angular stability.

The new filters offer numerous advantages, enabling more versatile and reliable optical systems. The use of organic materials allows for flexible tuning of spectral properties, potentially leading to lower production costs and reduced energy consumption in the manufacturing of large-area filters adaptable to various component shapes.

The outstanding angular stability of the PoLightFilters technology provides significant added value, particularly in applications such as fluorescence microscopy and sensor systems like Light Detection and Ranging (LiDAR). This enhanced stability translates to increased accuracy, range, and readout speed, setting new standards in automation and process optimization. Dr Andreas Mischok highlighted the potential for cost savings in industrial monitoring through a reduced sensor count. Other promising application areas include microscopy and biomedical research.

A core focus of the funded project, alongside the ongoing development of the patent-pending thin-film filter technology, is the optimization and scaling of its production. Simultaneously, the team is further developing its existing software package to enable a partially automated filter design process.

“With funding from the EXIST transfer of research programme, the PoLightFilters project is taking a decisive step towards market innovation,” stated Dr Andreas Mischok. “Beyond its direct application in LiDAR technology, this filter innovation is intended to serve as a model case for further applications. Through the successful combination of scientific research, technical development, and entrepreneurial implementation, supported by the University of Cologne’s Transfer Department and the Transfer Scouts of the Gateway Excellence Start-up Center, we aim to make a lasting contribution to the optimization of modern optical systems.”