Medizinische Universität Graz

Rector's Office
Auenbruggerplatz 2, A-8036 Graz

Thomas Edlinger, BA
Public relations and event management

thomas.edlinger@medunigraz.at
Tel. +43 / 316 / 385-72055
Fax +43 / 316 / 385-72030

Press release
For immediate publication

Graz researchers count nanoparticles in real time: Patented technology finds its way into industry

Graz, 8 September 2022: Nanoparticles are taking on an important role in many modern industries. Medicine, biotechnology, cosmetics and many other industries are embracing these tiniest particles to achieve special properties. Med Uni Graz spin-off and deep tech company BRAVE Analytics has celebrated breakthroughs in this area in cooperation with the University of Graz thanks to its innovative devices.

Research on the smallest scale

In a paper that has just appeared in Physical Review Applied, scientists from Med Uni Graz and Uni Graz recommend a measurement method that allows rapid, reliable and robust determination of these critical particle sizes. "In this method, the nanoparticles under investigation are pumped through a channel while a weakly focused laser beam moves in the direction of the flow and performs two tasks. First, the nanoparticles can be observed through the scattered light, and second, the light exerts forces on the nanoparticles," explains Ulrich Hohenester from the University of Graz.

Floating particles

In the current research, the nanoparticles are trapped by optically induced forces from the light field when they "float" through the measuring cell while being accelerated in the direction of the flow. Measurement and analysis of the acceleration of individual nanoparticles yields detailed information about the size distribution, geometry and concentration of the nanoparticles.

The idea for this method comes from Christian Hill of Med Uni Graz, who is currently developing a commercially available measuring instrument based on this method with his company BRAVE Analytics. Marko Šimić and Ulrich Hohenester of the Institute of Physics at the University of Graz were responsible for the theoretical description and evaluation of the experiments. "This interdisciplinary collaboration between medical research, theoretical and technological development along with medical and biomedical application also fits in well with the goals of BioTechMed-Graz," says researcher and entrepreneur Christian Hill.

New projects

With this innovative technology in tow, a project funded by the FFG (Austrian Research Promotion Agency GmbH) has started that explores sample preparation of nanotechnology/pharmaceutical fluids and particles for bone formation, emulsions, vaccines or similar products. The project began on 1 April 2022 and is scheduled to run through 20 June 2023. This research has been promoted and supported by the European

Commission through the project NanoPAT (grant agreement number 862583), in which Med Uni Graz is also involved.

This project explores the linkage of patented OF2i® technology in industrial processing plants in order to improve automated quality control and to reduce and eliminate bottlenecks. The project currently focuses on pharmaceuticals, biotechnology and materials science.

Market launch early next year

A highlight for the spin-off will be the official market launch of the B2 instrument series for lab applications at the beginning of next year. The series provides the described OF2i® measuring method as a compact lab instrument and can be used to measure time-resolved particle formation processes or detect very low concentrations "...as they play an important role in areas such as analysis of the water chemistry of plastic nanoparticles," explains Christian Hill.

The road to industry

The preliminary presentation and product demo at analytica 2022, the world's largest trade fair for laboratory technology, have already generated great interest, and close cooperation is also underway with various institutes at the Medical University of Graz, the University of Leoben and other interested parties.

"The manufacturing, assembly and final inspection of high-tech devices are carried out completely in the heart of Graz," says co-founder and CFO/COO Gerhard Prossliner. "Currently we are producing a good number of instruments." Advance orders are possible and handled on a first come, first serve basis.

Further information and contact:
Christian Josef Hill
Medical University of Graz
Gottfried Schatz Research Center
Division of Biophysics
Tel.: +43 / 316 / 385-71696
Email: christian.hill@medunigraz.at

Ulrich Hohenester
University of Graz
Institute of Physics
Tel.: +43 / 316 / 380-5227
Email: ulrich.hohenester@uni-graz.at

Profile: Christian Hill
Christian Hill studied environmental systems sciences at the University of Graz and then earned a doctorate at NaWi Graz. He has worked for Med Uni Graz at the Gottfried Schatz Research Center for Cell Signaling, Metabolism and Aging since 2018 and founded the spin-off BRAVE Analytics GmbH in 2020.

To the publication:
https://journals.aps.org/prapplied/abstract/10.1103/PhysRevApplied.18.024056