Microfluidics for nuclear fusion

TECHNISCHE UNIVERSITÄT DARMSTADT

Nano- and Microfluidics

Experiments for a sustainable future (Theses)

In light of the ongoing climate and energy crisis, sustainable power generation is urgently needed. Inertial confinement fusion (ICF) is a promising alternative that uses lasers to ignite small, fuel-filled targets, triggering a fusion reaction. This all-weather technology produces no long-lived radioactive waste and poses fewer safety risks than nuclear fission. In 2022, ICF demonstrated its first net energy gain. However, there is still a long way to go before it can be commercialized.
Currently, diamond targets are used that are time- and cost- intensive while having a high rejection rate and a limited batch size. In contrast, microfluidic chips hold great promise for producing economical fusion targets. Together with the startup Focused Energy, we research on making microfluidically produced targets competitive and ensure they meet required standards.

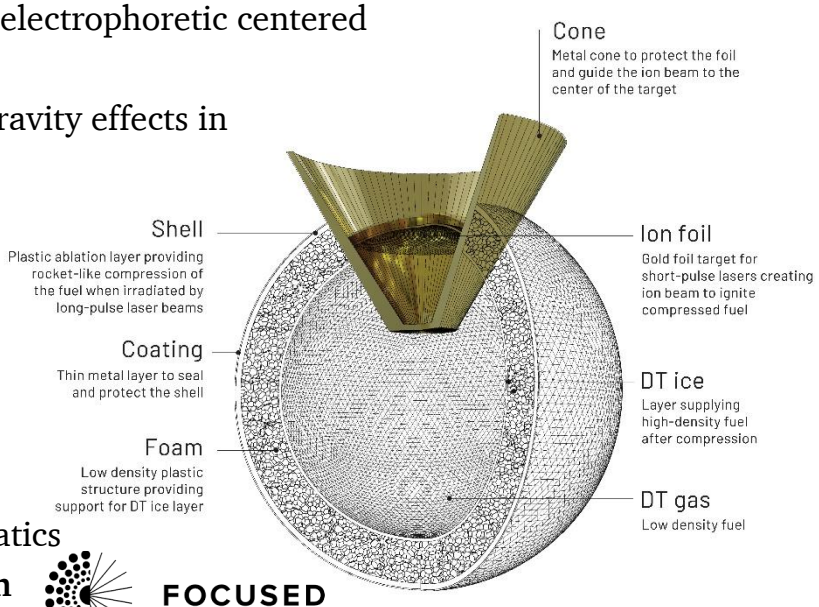
Feel free to write me a mail: bauer@nmf.tu-darmstadt.de

I am looking forward to hearing from you!!

Lisa

Currently, there are these topics available:

- **Droplet Drama:** Impact of buoyancy in double emulsion droplets for dielectrophoretic centering *(Bachelor/Master)*
- **Flowing disaster:** Impact of flow on dielectrophoretic centered double emulsion droplets *(Master)*
- **Like in Space(rs):** Spacers to reduce gravity effects in double emulsion droplets *(Bachelor)*



What we offer you:

- Hands-on experiences with **state-of-the-art equipment**
- Learn evaluation techniques, including **image processing in Python**
- **Individualized guidance**
- Research field: micro fluidics, electrostatics
- **Working with a dynamic startup team**

FOCUSED