Helmholtz-Zentrum Dresden-Rossendorf e.V.

With cutting-edge research in the fields of ENERGY, HEALTH and MATTER, around 1,500 employees from more than 70 nations at Helmholtz-Zentrum Dresden-Rossendorf (HZDR) are committed to mastering the great challenges facing society today. The Institute of Fluid Dynamics is conducting basic and applied research in the fields of thermo-fluid dynamics and magnetohydrodynamics in order to improve the sustainability, the energy efficiency and the safety of industrial processes. The Department of Fluid Dynamics Resource Technology Processes is looking for a

PhD Student (f/m/d)

Experimental analyses of Ion-Specific effects on Bubble-Particle Attachment and Bubble-Bubble Coalescence in Flotation

City: Dresden; Starting date (earliest): 01/05/26; Duration: 3 years; Remuneration: TVöD Bund; Reference number: 2026/35; Closing date: 01/05/26

Tasks

- Measure ion-specific effects on bubble-particle attachment and detachment using an innovative flotation kinetics apparatus
- Study particles from industrial partners to map attachment and detachment kinetics as functions of water composition, reagents, dosages, and their interactions
- Quantify ion-specific effects on bubble coalescence using innovative multicolour thin-film interferometry
- Evaluate synergistic effects between ions in recycled water and added frothing agents, and determine film lifetimes for model development
- Use an inline endoscope and an optical fiber Doppler probe (OFDP) to determine bubble surface loading as well as bubble size and velocity
- Integrate and interpret measurement data to derive robust relationships between water chemistry, reagents, and interfacial flotation mechanisms
- Support model development and model parameterization (e.g., attachment/detachment kinetics, coalescence models) based on experimental data
- Document, present, and publish results in reports, scientific contributions, and project meetings

Requirements

- Completed university studies (Master/Diploma) in the field of Process Engineering, Chemical Engineering, Chemistry (especially Physical Chemistry / Surface Chemistry), Physics, Mechanical Engineering, Materials Science, or a comparable discipline
- Experience in or strong interest in interfacial physics/chemistry, surface science,

wetting, thin films, and colloidal/interfacial phenomena
- Experience in or strong interest in bubble-particle interactions, especially attachment/detachment and flotation kinetics
- Basic familiarity with multiphase measurement systems (e.g., optical probes, inline endoscopy, interferometric methods) is an advantage
- Interest in model development and model parameterization based on experimental data (e.g., kinetic models, coalescence models) is desirable
- Independent, structured, and reliable way of working in the laboratory
- Strong problem-solving skills in experimental setup, instrumentation, and measurement campaigns
- Good teamwork and communication skills in an interdisciplinary project environment
- Willingness to collaborate with industrial and academic partners and to participate in experimental campaigns; a secondment of around 3 months in Cape Town, South Africa is planned
- Good programming skills for data analysis, image processing, and model fitting (e.g., Python, MATLAB)
- Good written and spoken English

What we offer

- A vibrant research community in an open, diverse and international work environment
- Scientific excellence and extensive professional networking opportunities
- A structured PhD program with a comprehensive range of continuing education and networking opportunities - more information about the PhD program at the HZDR can be found here
- Salary and social benefits in accordance with the collective agreement for the public sector (TVöD-Bund) including 30 days of paid holiday leave, company pension scheme (VBL)
- We support a good work-life balance with the possibility of part-time employment, mobile working and flexible working hours
- Numerous company health management offerings
- Employee discounts with well-known providers via the platform Corporate Benefits
- An employer subsidy for the "Deutschland-Ticket Jobticket"

Application

We look forward to receiving your application documents (including cover letter, CV, diplomas/transcripts, etc.), which you can submit via our online-application-system: https://www.hzdr.de/db/Cms?pNid=490&pLang=en&pOid=77003

More information at https://stellenticket.de/202789/OSTF/
Offer visible until 19/04/26