With more than 6,300 employees in research, teaching and administration and its unique profile, TU Dortmund University shapes prospects for the future: The cooperation between engineering and natural sciences as well as social and cultural studies promotes both technological innovations and progress in knowledge and methodology. And it is not only the more than 34,300 students who benefit from that.

2 Doctorate positions (m/f/d) in X-ray laser physics and ultrafast electron spectroscopy w-53-20

At the TU Dortmund University, positions for scientific employees (m/f/d) are available starting at the earliest possible date for a period of three years. The PhD positions allow for research towards a dissertation at the Faculty of Physics.

According to public tariff regulations, the salary for the PhD positions is based on tariff group E13 TV-L with 50% of the regular work time, with an increase to 75% within the employment period.

For the investigation of the fundamental excitation processes in atoms and molecules it is necessary to observe their dynamics in real time, which happens on temporal scales comparable to a single oscillation period of the visible light field (2.7 fs at 800 nm). Even shorter “pump” pulses to trigger the atomic and molecular changes require driving wavelengths in the extreme ultraviolet and X-ray regime. These ultrashort pulses can best be produced at X-ray free-electron lasers (XFELs) like the *European XFEL* in Hamburg or the LCLS in California, USA.

In the framework of a project funded by the German *Bundesministerium für Bildung und Forschung* (BMBF) we are developing a novel detection method for a class of ultrafast experiments at XFELs that combine high energy, spatial and temporal resolution with high repetition rates. The envisioned detector consists of multiple, circularly arranged time-of-flight (TOFs) tubes for the simultaneous measurement of electron or ion kinetic energies in arbitrary directions of the detection plane.

**YOUR RESEARCH TOPICS:**
- Simulations and experimental studies of electron/ion time-of-flight detector design with respect to number and geometry of the TOFs, their detection efficiency, energy range & resolution.
- Actively planning and taking part in ultrafast electron spectroscopy measurements at XFELs in cooperation with international research groups. A beam time at the *European XFEL* has been allocated 5 shifts for the next run, preparations are well under way.
- Developing and implementing novel research concepts at XFELs for the real-time investigation of excitation dynamics in atoms or in more complex systems, e.g. structural changes in biomolecules. In addition, the positions may involve the preparation and conduction of courses (2 hours/week) as well as the supervision of students.

**YOUR PROFILE:**
- Master level university degree in physics or a closely related discipline (e.g., electrical engineering) with very good grades.
- Experimental experience in electron spectroscopy, ultrashort laser or X-ray-related work work and/or knowledge of detector design and construction.
- Familiarity with SIMION and Matlab/Python for simulations and data analysis as well as Inventor or SolidWorks for 3D design of the detector would be helpful.
- Very good language skills, orally and in writing, in German and/or English.

We explicitly note that applications of all sexes are welcome. Applications from women are favoured complying with legal regulation.

We explicitly note that applications of severely disabled persons are welcome. Please send your applications including copies of the usual documents by mail or email stating the **reference designation w53-20 till 25.09.2020**

Jun.-Prof. Dr. Wolfram Helml
TU Dortmund, Zentrum fuer Synchrotronstrahlung (DELTA)
Maria-Goeppert-Mayer-Str. 2
44227 Dortmund
Germany

If you have questions, please contact: Wolfram.Helml@tu-dortmund.de or phone +49 231 755-5376