

The Max-Born-Institute for Nonlinear Optics and Short-Pulse Spectroscopy (MBI), Berlin, Germany, a non-university research institution and member of the Leibniz Association, pursues basic and applied research in ultrafast science, applying a large variety of lasers and methods of time-resolved spectroscopy and structure research.

The Max-Born-Institute invites applications for a

Bachelor/ Master Project in Time-resolved spectroscopy with attosecond XUV pulses and coherent diffractive imaging of isolated gas-phase nanoparticles (m/f/d)

Job profile: Intense coherent X-ray pulses from large scale facilities called free-electron lasers have opened up the possibility to take snapshots and movies of individual nanoscale particles like aerosols, single bacteria, metal nanocrystals or superfluid ultracold droplets of helium. This field got another push with the demonstration of single-shot imaging of isolated helium nanodroplets using extreme ultraviolet pulses from a femtosecond laser-driven high harmonic source (3). In our current research program at the Max-Born-Institute, we explore single-shot gas-phase nanoscopy with our high-intensity high-harmonic source. Our goal is to develop coherent diffractive imaging with attosecond pulses, which will allow us to directly visualize ultrafast laser-driven dynamics on the nanoscale.

By joining our team, you will gain expertise in several of the listed subjects and activities.

Covered subjects

- Femtosecond laser pulses and Optical Parametric Chirped Pulse Amplification
- High-harmonic generation and XUV optics
- Attosecond pulse generation and characterization
- Electron and Ion time-of-flight spectroscopy and Velocity Map Imaging spectroscopy
- Coherent diffractive imaging of clusters

Experimental and theoretical activities

- Measurement and analysis of XUV-IR and XUV-XUV correlations
- Installation of the CDI experiment
- Simulation of HHG propagation effects and raytracing

Related literature

- (1) Z. Chang, Fundamentals of Attosecond Optics, CRC Press, 2011
- (2) C. Bostedt et al., Clusters and Nanocrystals in Synchrotron Light Sources and Free-Electron Lasers: Accelerator Physics, Instrumentation and Science Applications, Springer, 2016, DOI: 10.1007/978-3-319-14394-1_39
- (3) D. Rupp et al., Coherent diffractive imaging of single helium nanodroplets with a high harmonic generation source, Nature Communications, DOI: 10.1038/s41467-017-00287-z
- (4) D. Rivas et al., Propagation-enhanced generation of intense high-harmonic continua in the 100-eV spectral region, Optica, DOI: 10.1364/OPTICA.5.001283

Requirements:

We are looking for a highly motivated student (m/f/d) with a strong scientific interest in ultrafast science. In case of a Master Project a Bachelor degree in physics or a related field is required.

Offer:

The Max-Born-Institute in Berlin is one of the leading research centers in the world for Attosecond Science. We are offering Bachelor and Master projects on a regular basis, on which you work in close collaboration with PhD students and experienced scientists.

MBI is an equal opportunity employer and places particular emphasis on fostering career opportunities for women. Qualified women are therefore strongly encouraged to apply. If equally qualified, severely handicapped persons are given preference.

MBI supports the reconcilability of family and working life and is certified as family-friendly by the "family audit".

Contact:

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