Hosted by the Department of Chemistry and Physics

Ultrafast science using x-ray free-electron lasers

A colloquium sponsored by the Society of Physics Students

Dr. Robin Santra

Department of Physics at the University of Hamburg; Center for Free-Electron Laser Science (CFEL); Deutsches Elektronen-Synchrotrom (DESY)

X-ray free-electron lasers (XFELs) offer exciting research opportunities for revealing ultrafast dynamics in matter in real time; measuring the atomically-resolved structure of complex molecules and molecular assemblies; and creating and probing astrophysically relevant, extreme states of matter. In my presentation, I will first introduce the basic physical interaction mechanisms that underlie and accompany applications of x rays. I will then explain the principles characterizing the operation of XFELs. Numerous insightful investigations have already been performed using XFELs. In my presentation, I will focus on two recent studies in ultrafast science: the first observation of the fastest molecular processes in the radiolysis of water [1], and the first x-ray attosecond pump and x-ray attosecond probe measurement on a condensed-phase sample [2].

[1] Z.-H. Loh *et al.*, Science **367**, 179 (2020); https://doi.org/10.1126/science.aaz4740
[2] S. Li *et al.*, Science **383**, 1118 (2024); https://doi.org/10.1126/science.adn6059

Friday, September 20th, 2024
4:00 PM EST in Jepson 225

Please contact SPS president Carly Healy at chealy2@mail.umw.edu with any questions!

Hosted by the Department of Chemistry and Physics

Open to all who wish to attend