

Hosted by the Department of Chemistry and Physics

# Making Molecular Movies with Ultrafast X-rays

A colloquium sponsored by the Society of Physics Students



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When a molecule absorbs light, the energy is redistributed between its electrons and nuclei, often leading to bond rearrangements or chemical reactions. These processes occur on femtosecond to attosecond timescales, making them difficult to observe directly. Ultrafast lasers and X-ray free-electron lasers now allow us to follow these dynamics in real time using pump-probe methods. I will introduce the basic physics behind how these techniques achieve high temporal and structural resolution, and show how they can reveal both nuclear motion, such as bond stretching and dissociation, and electronic processes, such as Auger decay. By combining concepts from chemistry and physics, these approaches provide a detailed view of how light drives molecular change.

**Friday, October 3, 2025**

**4:00 PM EST in Jepson 225**

Please contact SPS president Boone Fleenor at [bfleenor@mail.umw.edu](mailto:bfleenor@mail.umw.edu) any questions!

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**Open to all who wish to attend**

