

CONDENSED MATTER COLLOQUIUM SERIES

#Ankara

Burak Güzeltürk

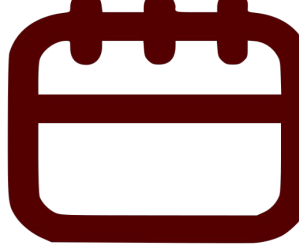
Argonne National Laboratory


Catching Atoms in the Act: Ultrafast Diffraction Tools for Light-Driven Materials Science


What happens inside a material when it's hit with a burst of light? Can we control how atoms move, how different phases emerge – or even turn a material into a superconductor – using light alone?

In this talk, I'll introduce how ultrafast x-ray and electron diffraction techniques allow us to capture snapshots of materials in motion – down to atomic scales and trillionths of a second. These tools allow us to explore how materials respond to light far from equilibrium, opening up new directions in data storage, quantum devices and energy technologies.

I'll walk through the core ideas behind these experimental techniques, highlight some striking examples – such as light-triggered superconductivity – and share recent work from my research on visualizing the light-induced melting of domain walls in ferroelectrics, tracking polaron formation in solar materials, and observing symmetry changes in quantum dots. This talk is aimed to be accessible to undergraduate and graduate students curious about ultrafast science, materials physics, and experimental methods at the frontier of light-matter interactions.

 *May, 13, 2025
Tuesday*

 *19:00, (Ankara Time)*

 *Click [here](#) for zoom link
Meeting ID: 432 931 6595
Password: 326852*

Dr. Burak Guzelturk is a physicist at Argonne National Laboratory, where he works as a beamline scientist at the Advanced Photon Source – one of the world's brightest x-ray sources. Before joining Argonne, he was a postdoctoral scholar at Stanford University and SLAC National Accelerator Laboratory. He earned his B.Sc., M.Sc., and Ph.D. in Electrical and Electronics Engineering from Bilkent University in Ankara, Turkey. His research focuses on developing time-resolved x-ray diffraction methods to explore how light can drive ultrafast structural changes in quantum and functional materials. Beyond the lab, he enjoys sharing the excitement of watching atoms move in real-time and the new frontiers this opens up in materials science and physics.

For more information visit

acmc.bilkent.edu.tr

*If you have any queries, please contact oktel@fen.bilkent.edu.tr
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