

# CONDENSED MATTER COLLOQUIUM SERIES

# Ankara

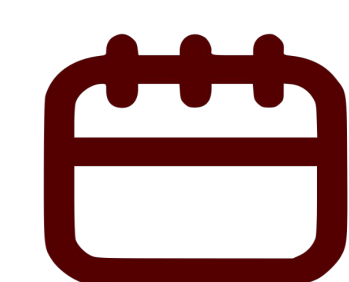
## Turan Birol

University of Minnesota



### ***Altermagnets: a new phase of matter?***

Even though there are accounts of ferromagnetic materials from 2500 years ago, the antiferromagnetic phase (where the spins of electrons in a solid order in a staggered fashion) has a much shorter history. More recently (just about 5 years ago) claims of a new magnetic phase dubbed "altermagnetism" have emerged. In this talk, I am going to use a combination of first principles quantum mechanical simulations (Density Functional Theory) and group theory based symmetry approaches to discuss what altermagnets are, and more importantly, what they are not. In particular, I will derive strict symmetry conditions related to magnetic multipoles to define an altermagnetic phase that is distinct from the antiferromagnetic one, and using DFT, show what effects this new phase has on the electronic structure. I will then discuss the unique macroscopic responses that altermagnets exhibit with a focus on piezomagnetic and magneto-optical properties.



October, 22

Tuesday



19:00, (Ankara Time)



Click [here](#) for zoom link

Meeting ID: 432 931 6595

Password: 326852

**Turan Birol** is an associate professor at University of Minnesota. After receiving his BS and MS degrees from METU and Koc University, he earned his PhD in Physics from Cornell University. Following a postdoctoral research position at Rutgers University Condensed Matter Theory Group, he joined the University of Minnesota as an assistant professor in 2016. His research interests lie in the intersection of solid state physics with materials chemistry, and his research areas include a wide range of phenomena ranging from ferroelectrics to charge density waves. His expertise includes applications of group theoretical methods onto solid state systems, as well as first principles calculations including density functional theory and dynamical mean field theory.

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