

Zernike Colloquium

May 4th, 2023

16:00h

5111.0080

Hunting for Hidden Magnetic Order



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Most magnetic materials, phenomena and devices are well described in terms of their constituent magnetic dipoles. There is mounting evidence, however, that higher-order magnetic multipoles can lead to intriguing magnetic behaviors, which are often attributed to “hidden order” since they are difficult to characterize with conventional probes.

In this talk I will discuss the existence and relevance of the so-called magnetoelectric multipoles, which form the next-order term, after the magnetic dipole, in the multipolar expansion of the energy of a magnetization density in a magnetic field. First, I will describe how magnetoelectric multipoles underlie multiferroic behavior and in particular how they determine the magnetic response to applied electric fields. Then I will discuss signatures of hidden magnetoelectric multipolar order, how it can be unearthed using density functional calculations and possibilities for its direct measurement. Finally, I will show that the bulk magnetoelectric multipolization causes a magnetization at the surface of a sample, even in materials with no net magnetization in their bulk.

Coffee from 15:30h
Drinks & Snacks after



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