

MAR10-2009-020234

Abstract for an Invited Paper
for the MAR10 Meeting of
the American Physical Society

Oliver E. Buckley Prize Talk: Exotic Order in Solids

DOV LEVINE, Technion – Israel Institute of Technology

Historically, solids were classified as crystalline or amorphous, the former being characterized by delta function Bragg peaks in their diffraction patterns. Quasicrystals are solids with long range quasiperiodic translational order and symmetries forbidden to crystals, and, like crystals, their diffraction spectra consist of discrete Bragg peaks. As such, both crystals and quasicrystals are easily identified by scattering, and their degree of perfection is readily quantified. These two classes, crystals and quasicrystals, while large, do not exhaust all the possibilities for ordered solids, and models of ordered materials which exhibit no Bragg scattering may be constructed. Consequently, a different criterion for the characterization of long range order (which would subsume crystals and quasicrystals) is needed for their description, as well as for the quantification of the extent of their order.