

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

“Nonlinear screening of charged impurities in topological materials”

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Abstract: Due to its long-ranged nature, Coulomb disorder often has dramatic consequences even in situations where short-ranged disorder does not. This is particularly the case for materials with vanishing density of states, such as insulators and semimetals, which have no intrinsic ability to screen charged impurities. In such materials screening happens only in a nonlinear way that involves significant band bending and the formation of electron/hole puddles. In this talk I discuss this process of nonlinear screening and its implications for electronic transport, focusing primarily on 3D topological insulators and Dirac semimetals. I show in particular that Coulomb disorder, at any finite concentration, significantly reduces the bulk activation energy in 3D TIs and smears out the Dirac point in Dirac semimetals. Some potential future directions of research are also discussed.

12:00noon
Tuesday, September 15, 2015
Duboc Seminar Room (4-331)