Arun Bansil, J Material Sci Eng 2015, 4:3
http://dx.doi.org/10.4172/2169-0022.C1.030

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Mesoscopic & Condensed Matter Physics

June 22-24, 2015 Boston, USA

Arun Bansil

Northeastern University, USA

Topological insulators, novel superconductors, and 2D atomically thin films beyond graphene

The author will discuss some of our recent results aimed at understanding the electronic structure and spectroscopy of novel superconductors, topological materials, and atomically thin 2D films. Illustrative examples include: (i) How by exploiting electronic structure techniques we have been able to predict and understand the characteristics of many new classes of binary, ternary and quaternary topologically interesting materials, including topologically crystalline insulators; (ii) How atomically thin 'beyond graphene' 2D materials such as silicene, germanene, stanene, and MoSe2 offer exciting new possibilities for manipulating electronic structures and provide novel applications, platforms; (iii) Asymmetry of the Sscanning Tunneling (STM) spectrum of the cuprate high-Tc superconductors between positive and negative bias voltages and the extent to which it reflects strong correlation effects; (iv) Character of the doped holes in the curpate superconductor La-Sr-Cu-O as revealed by the analysis of doping dependent high-resolution Compton scattering studies.

Biography

Arun Bansil is a University Distinguished Professor in physics at Northeastern University. He served at the US Department of Energy managing the Theoretical Condensed Matter Physics program (2008-10), is as an Academic Editor of the international *Journal of Physics and Chemistry of Solids,* the Founding Director of Northeastern University's Advanced Scientific Computation Center, and serves on various international editorial boards and commissions. He has authored/co-authored over 260 technical articles, 18 volumes of conference proceedings, covering a wide range of topics in theoretical condensed matter and materials physics, and a major book, *X-Ray Compton Scattering* (Oxford University Press, Oxford, 2004).

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