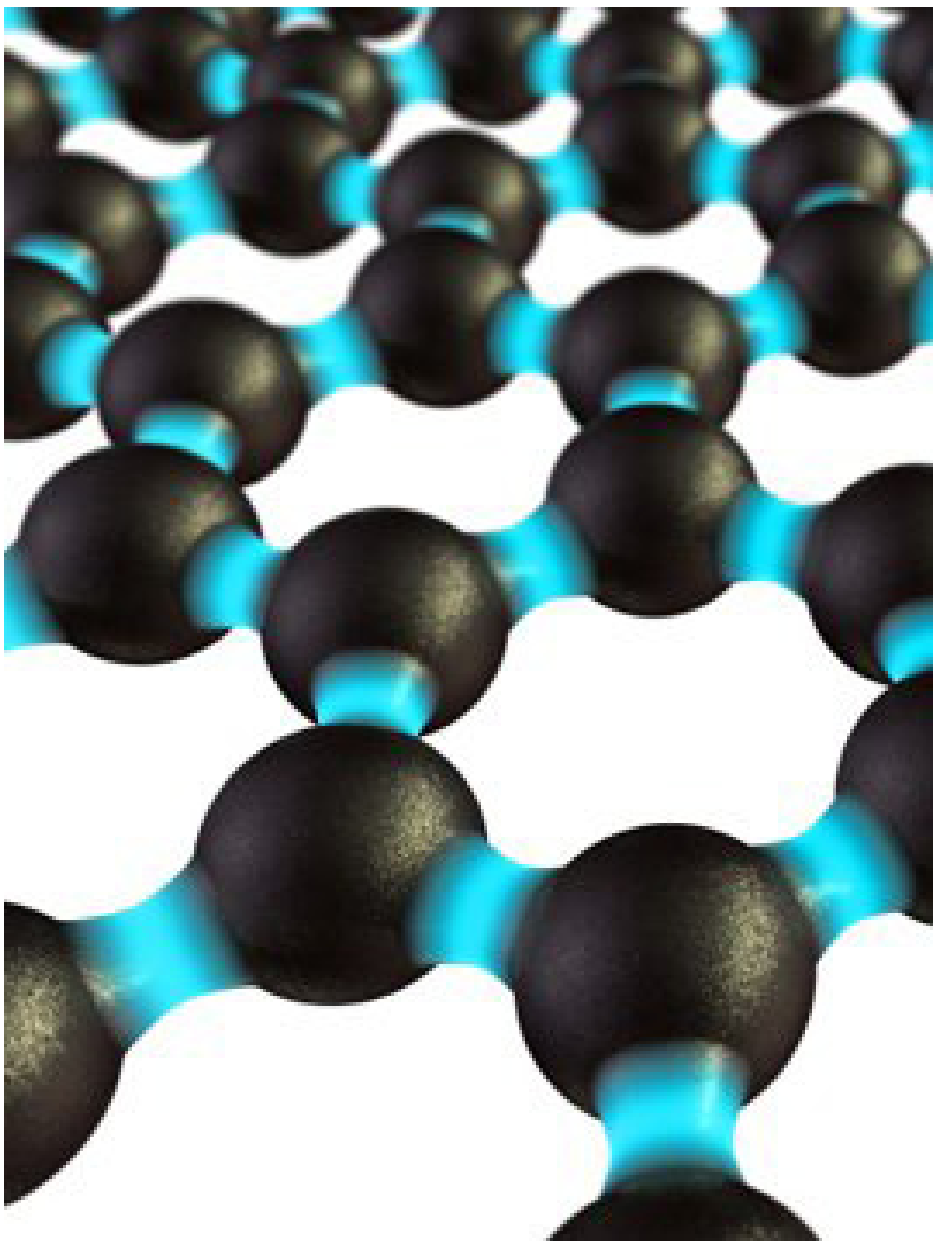
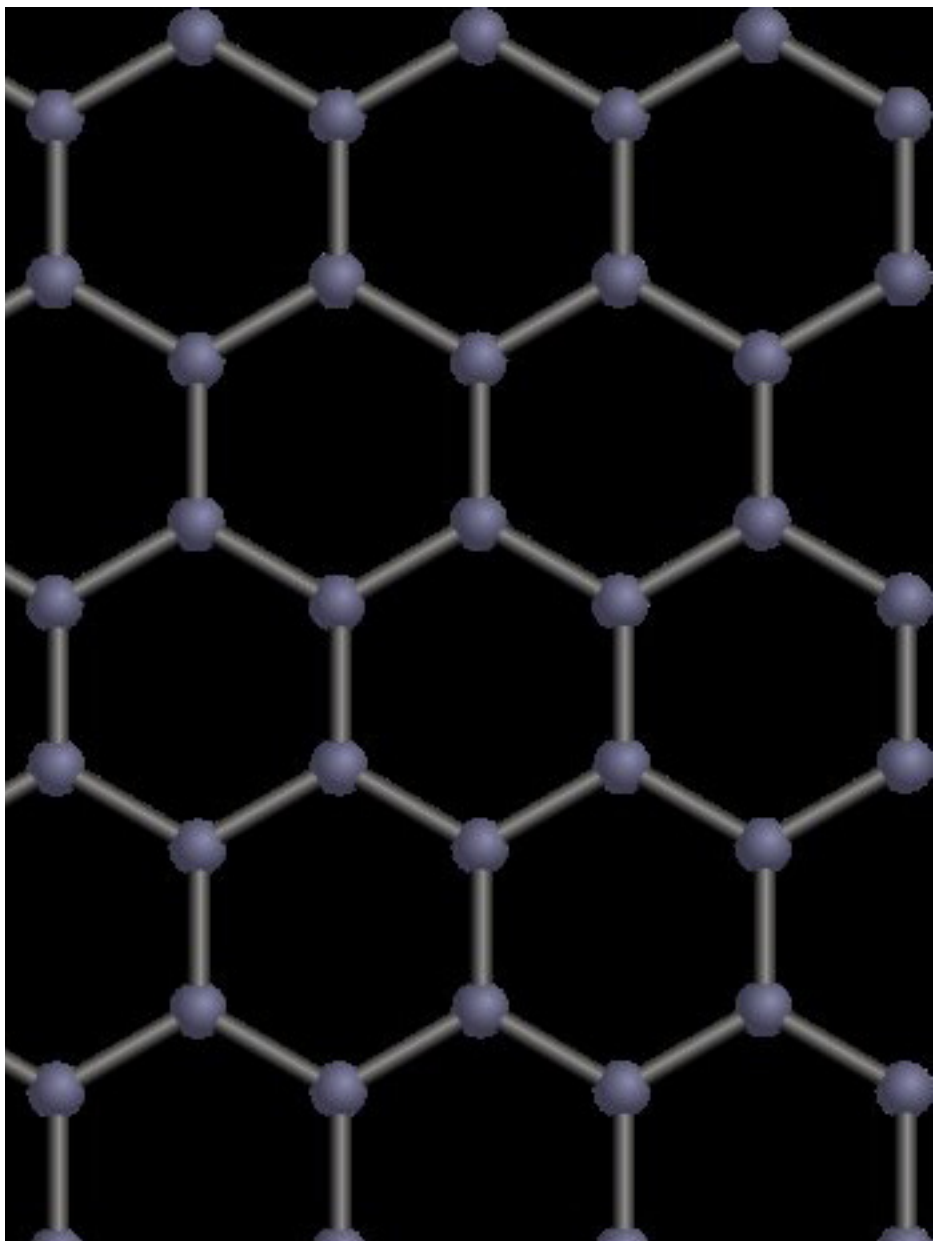
Boston University Physics Colloquium





What a Particle Physicist Can Learn from Graphene

Graphene is a two-dimensional semi-metal where the electron obeys an emergent relativistic Dirac equation. The resulting electronic properties of this material make it both a fascinating case study in condensed matter physics and a promising new substance for electronics technology. It also offers a novel testing ground for issues associated with the quantization of the relativistic particle, such as Zitterbewegung and the Schwinger and Klein effects which have proven difficult to test in the particle physics world, but have profound effects on the physics of graphene. As well, graphene electrons are putatively strongly correlated and some effects of strong interaction, such as dynamical symmetry breaking and the fractional quantum Hall effect, have been observed. This provides both a simple example of the symmetry breaking phenomenon as well as posing a puzzle as to why, if interactions are strong, so much of the physics of graphene is described by weakly interacting, or even non-interacting electrons. Attempts at some insight into this question will be presented.

Gordon Semenoff

University of British Columbia, Canada

April 10, 2012 (Tuesday) at 3:30pm (Refreshments at 3:15pm)

SCI 109, Metcalf Science Center, Boston University

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Host: So-Young Pi