

# *Chez Pierre*

Presents ...

**Monday, October 15, 2018**

**12:00pm Noon**

**MIT Room 4-331**

## **Chez Pierre Seminar**

**David Vanderbilt, Rutgers University**

“Theory of axion insulators”

Topological insulators such as  $\text{Bi}_2\text{Se}_3$  exhibit a quantized orbital magnetoelectric coupling, known as an axion coupling, which is reflected in the presence of a half-integer quantum anomalous Hall response on any gapped surface. However, unless the time-reversal symmetry that protects the bulk topology is broken at the surface, the surface is necessarily metallic and the axion response is hidden. Here I will introduce a broader class of topological crystalline insulators such that the quantized axion coupling is protected by other symmetries, such as inversion, in such a way that the surfaces are naturally gapped. Unfortunately, materials realizations currently remain elusive. Nevertheless, I will present some results of our exploration of simple tight-binding models of such systems, and will describe some of the interesting properties such materials are expected to display, including chiral edge channels flowing along surface steps and facet intersections.

