

# Columbia University

## Department of Physics



### Theory Seminar

“Strongly coupled electron systems from holography and the birth and collapse of anti-de-Sitter stars”

The application of the holographic AdS/CFT correspondence to condensed matter systems has shown us remarkable new insights into strongly coupled quantum matter. It provides a novel quantum critical origin of superconductivity that lies outside BCS theory; and it is holographically able to describe non-Fermi liquids as directly observed in experiments in strongly correlated electron systems. In the pursuit of a holographic construction as close to a real quantum critical electron system as possible, I will discuss how the inherent quantum nature of bulk AdS fermions, dual to  $1/N$  corrections in the field theory, is essential to capture the correct physics, and show how the descent of the strongly coupled fermi state into the novel holographic superconductor is described by the collapse of a "star" in anti-de-Sitter space.



**Koenraad Schalm,**  
Institute-Lorentz for Theoretical Physics Leiden University

Monday, November 12, 2012 / 2:10 PM / 831 Pupin Hall