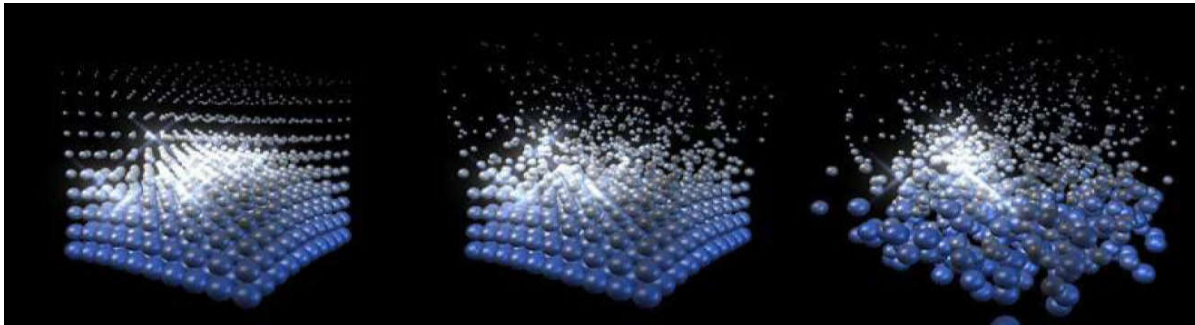


COLLOQUIUM



Dr. Ettore Vitali
College of William and Mary

Computational Physics, from Random Walks to Strongly Correlated Systems

Abstract

Since the earliest days of Quantum Mechanics, we witnessed great achievements in the exploration of how Nature works at the atomic scale. Nevertheless, unravelling the complexity of highly correlated systems is still a huge challenge. Several unexpected fascinating new features appear when the interaction become strong and new approaches are needed to shed light into the physical mechanism underlying the puzzling emergent phenomena. In the petaflops era, unprecedented computational resources put us in a unique position to pave the way for a deeper insight. Starting from the idea of Feynman paths, I will show how is it possible to use a computer to get accurate answers for strongly correlated systems. I will present cutting-edge results for superfluids and cold atomic systems, for which we are now able to predict dynamical quantities that can be directly compared with experiments, and for high-temperature superconductors, where we are finding novel fascinating orders. The methodologies themselves can also have important applications beyond the realm of strongly correlated quantum physics, with impact on several branches of science, from systems of biological interest to modeling of complex systems

2:00-3:00 p.m., Monday, April 23rd, McLane Hall 258
Special time and place. All are welcome!