



Department of Physics Colloquium

December 11, 2023



3:00 PM

Nematicity, Superconductivity and Broken Symmetries in Fe-based Materials

Prof. Eduardo Higinio da Silva Neto
Yale University

Unconventional superconductivity in Fe-based materials has been studied for more than 15 years. Electronic nematicity, where rotational symmetry is broken, is a novel quantum state of matter proposed 25 years ago [*Nature* **393**, 550 (1998)]. This phase has been shown to play an important role in the phase diagram of the Fe-based superconductors, as indicated by recent experiments that revealed the existence of nematic quantum criticality and strange metal behavior [e.g. *Nature* **567**, 213 (2019)]. However, as summarized in a recent review [*Nature Physics* **18**, 1412 (2022)], how nematicity influences superconductivity and whether nematic fluctuations can create superconductivity on their own are crucial questions that have thus far remained unanswered. In this talk, I will delve into our recent experiments aimed at addressing this particular question. We have focused our studies on the intriguing $\text{FeSe}_{1-x}\text{S}_x$ system via scanning tunneling spectroscopy measurements, complemented by photoemission experiments and theoretical calculations.

This colloquium will be held in-person, at SERC 116 unless announced otherwise.