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Department of
Theoretical Physics

# Tata-Infosys Lecture Series

## Higgs Confinement Phase Transition in Gauge Theories with Superfluidity

**Srimoyee Sen**
(Iowa State University)

**Date / Time**
2 December 2019, 10:00 AM

3 December 2019, 11:30 AM

4 December 2019, 10:00 AM

**Venue:** A-304, TIFR

I discuss the conditions under which Higgs and confining regimes in a gauge theory can be sharply distinguished. It is widely believed that these regimes are smoothly connected unless they are distinguished by the realization of global symmetries. However, I show that when a U(1) global symmetry is spontaneously broken in both the confining and Higgs regimes, there is a novel order parameter which can detect certain Higgs-confinement phase transitions. This result is explained in the context of certain tractable gauge theories in three spacetime dimensions. These observations significantly strengthen the case for the necessity of a phase transition between nuclear matter and quark matter in QCD.