

When: 3:00 PM, Thursday, October 24

Where: Aula A, Department of Physics, Via Valerio 2, Trieste

Title: *Changing Moods in Nature: Phase Transitions*

Speakers: Professor Andrea Trombettoni, Department of Physics, University of Trieste
Professor Giuseppe Mussardo, Statistical Physics Research Group, SISSA, Trieste

Professors Andrea Trombettoni (University of Trieste) and Giuseppe Mussardo (SISSA) will hold a special lecture for physics students at the University of Trieste as part of the celebrations for the 20th anniversary of the *Journal of Statistical Mechanics: Theory and Experiment (JSTAT)*. The talk aims to provide an overview of key research areas and the major challenges in the field of phase transitions, shedding light on the broad impact of these phenomena in other domains of science, such as complexity theory.

Professor Giuseppe Mussardo will offer a comprehensive overview, using examples and stories, of well-known phase transitions visible to the naked eye (e.g., the transition from water to vapor, magnetism), as well as more advanced topics like superfluids, superconductors, and low-temperature physics. He will demonstrate how all these phenomena can be understood using the concepts of statistical physics and field theory.

In the second part of the talk, Professor Andrea Trombettoni will delve into a specific model, showing how it can be studied through numerical simulations and experiments with cold atoms. These versatile cold atoms allow for the simulation of quantum phenomena that are not directly related to atomic systems, thus enabling scientists to explore a wide range of physical effects using these techniques.