

From first order phase transitions to Gravitational waves

Thursday, 11 April 2024 10:30 (30 minutes)

Gravitational waves can be produced from first order cosmological phase transitions that occur early in the Universe. I will show exciting recent results showing that i) some scenarios with grand unification may already be constrained by LIGO data because they imply a first order phase transition that is too strong and ii) a possible signal of a stochastic gravitational wave background from pulsar timing array experiments. These results mean that we have now entered an era where robust predictions of the gravitational wave spectra from first order phase transitions are vital. Based on a recent invited review, *Prog.Part.Nucl.Phys.* 135 (2024) 104094, and several related works, I will discuss various subtle issues in the prediction of gravitational wave spectra from first order phase transitions that can significantly impact the predictions and review the current status of predictions for gravitational waves from first order phase transitions. In particular I will discuss criteria for determining if a phase transition completes, and the dependence of gravitational wave predictions on the transition temperature and a variety of standard approximations.

Presenter: Prof. ATHRON, Peter (NJNU)

Session Classification: Plenary