

Gravitational Wave signatures of Reheating after Warm Axion Inflation

Wednesday, 18 February 2026 11:00 (20 minutes)

Before the Big Bang, the Universe experienced an era of accelerated expansion known as inflation. Reheating is the process that bridges this inflationary phase to the hot Big Bang, and it also provides one of the few opportunities for information from the inflaton sector to survive into the later Universe. Although many details of the inflaton's interactions are erased as the Universe thermalizes, gravitational waves offer a uniquely robust channel capable of preserving these microscopic imprints.

In this talk, I will show that when the inflaton is an axion coupled to a dark gauge sector, the reheating dynamics become inherently non-trivial. The axion's Chern–Simons coupling activates strong gauge-field production, glueball formation, and a delayed transfer of energy into light degrees of freedom. A key consequence is that integrating out the heavy glueballs induces effective higher-curvature operators, enabling the inflaton to decay directly into gravitons—an effect that cannot arise in standard Einstein gravity. This mechanism leads to a characteristic enhancement of the high-frequency gravitational-wave background. I will present the resulting gravitational-wave spectrum and discuss possible cosmological implications.

Presenter: TSUJI, Tenta

Session Classification: parallel session B: Cosmo