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Proton Decay and Gravitational Waves as Complementary Tests of Grand Unification

Wednesday, 10 April 2024 09:30 (30 minutes)

I will discuss how proton decay, combined with gravitational waves, can be used to test Grand Unified Theories (GUTs). In particular, proton decay searches by large multipurpose neutrino experiments such as DUNE, Hyper-Kamiokande, and JUNO will either discover proton decay or further push the symmetry-breaking scale above 10ˆ16 GeV. Another possible observational consequence of GUTs is the formation of a cosmic string network produced during the breaking of the GUT to the Standard Model gauge group, which can produce a stochastic background of gravitational waves. Several gravitational wave detectors will be sensitive to this over a wide frequency range. I will demonstrate the non-trivial complementarity between the observation of proton decay and gravitational waves produced from cosmic strings in determining SO(10) GUT breaking chains and their compatibility with leptogenesis as a means of producing the observed matter-antimatter asymmetry.

Presenter: Prof. TURNER, Jessica (IPPP Durham)

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