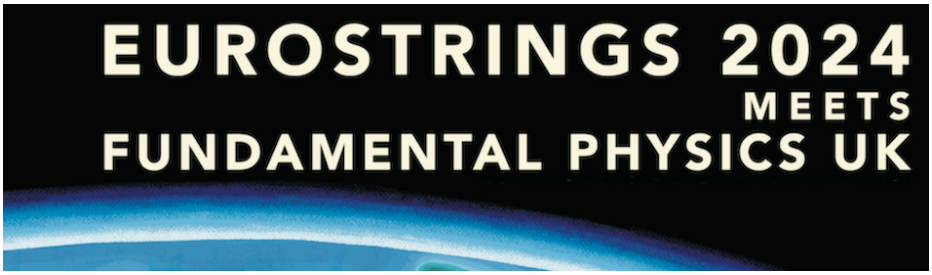

Contribution ID: **124** Type: **Talk in parallel session**

Isospectrality in Effective Field Theory Extensions of General Relativity

Monday 2 September 2024 14:30 (20 minutes)

Two universal predictions of general relativity are the propagation of gravitational waves of large momentum along null geodesics and the isospectrality of quasinormal modes in many families of black holes. In extensions of general relativity, these properties are typically lost: quasinormal modes are no longer isospectral and gravitational wave propagation is no longer geodesic and it exhibits birefringence —polarization-dependent speed. We study these effects in an effective-field-theory extension of general relativity with up to eight-derivative terms and show that there is a unique Lagrangian that has a non-birefringent dispersion relation for gravitational waves and isospectral quasinormal modes in the eikonal limit. We argue that both properties are related through a generalized correspondence between eikonal quasinormal modes and unstable photon-sphere orbits. These properties define a special class of theories that we denote as isospectral effective field theories. We note that the lowest-order isospectral correction to general relativity coincides with the quartic-curvature correction arising from type II string theory, suggesting that isospectrality might be a key feature of quantum gravity.

Link to publication (if applicable)

https://arxiv.org/pdf/2402.02215

Authors: DAVID, Marina; CANO, Pablo A. (University of Barcelona)

Presenter: DAVID, Marina

Session Classification: Parallel sessions

Track Classification: Black holes