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Exploring the Multipole Structure of Binary Black Hole Spacetimes¹ ISH GUPTA, ANURADHA GUPTA, Pennsylvania State University, K.G. ARUN, Chennai Mathematical Institute, B.S. SATHYAPRAKASH, Pennsylvania State University — Gravitational-wave (GW) observations facilitate a new probe of the strongly nonlinear dynamics of black hole spacetimes. This is the regime where modified theories of gravity could differ markedly from general relativity (GR). Thus, GW observations can be used to put constraints on certain modified theories of gravity and test the validity of GR. Such a test was proposed in arXiv:1905.07277, where the phase evolution of black hole binaries derived in the Multipolar Post-Minkowski (MPM) formalism is used to probe the validity of GR by introducing non-GR parameters for each multipole. In this presentation, we describe the implementation of this test using the LALSuite framework and its application to a subset of events from the first and second observing runs of LIGO and Virgo.

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