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A "No-hair"test of binary black hole nature

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Compact objects such as neutron stars or black holes or those of more exotic origin, by the virtue of their spin incur deformations that can be characterised in terms of the spin-induced quadrupole and other higher order moments. The magnitude of these deformations depends on the specific nature of compact objects in question. If the compact object is a Kerr black hole, its quadrupole moment can be expressed solely in terms of its mass and spin. On the other hand, for a compact object of different nature, these induced deformations will also depend on some additional parameters (such as on equation of state) of the compact object. Gravitational wave observations of compact binary sources can be used to measure these deformations and hence can allow one to test the nature of the observed compact binary source. Here we present the results of our recent investigations where we follow a novel approach to test the binary black hole nature of a compact binary source by measuring the spin-induced quadrupole moment of the binary using its gravitational wave observations in advanced LIGO detectors.

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