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A Post-Newtonian Inspired Ringdown Model SSOHRAB BORHANI, ARNAB DHANI, Pennsylvania State University, K.G. ARUN, Chennai Mathematical Institute, BANGALORE SATHYAPRAKASH, Pennsylvania State University — The LIGO and Virgo detectors have observed about 40 gravitational wave events, most of them emitted from binary black holes. The causes for this abundance are twofold: not only are these binaries the most luminous sources, but also the simplest to model and thus look for. This simplicity is rooted in the rather straightforward description of a single black hole within general relativity, but it does not extend to the connection of the inspiral and ringdown regimes which is currently still done phenomenologically. In this study we present a pure ringdown model that uses the four dominant spherical harmonic modes with post-Newtonian inspired amplitudes that depend on the mass ratio and spins of the two progenitor black holes. Thus, it bridges the gap between the two regimes, by measuring inspiral, two-body quantities during the ringdown, one-body phase of the evolution of the binary. This has two interesting applications for binary black hole observations: Firstly, it can be used for ringdown-only signals and still obtain progenitor information. Secondly, it allows a separate measurement of these variables with an independent model to check the consistency of the underlying theory, thus yielding a test of general relativity.

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