Multipole Moments of Dynamical Horizons in the Ringdown of Binary Black Holes YITIAN CHEN, PRAYUSH KUMAR, Cornell University, NILS DEPPE, California Institute of Technology, LAWRENCE KIDDER, SAUL TEUKOLSKY, Cornell University, SXS COLLABORATION — The black hole uniqueness theorems imply that the final state of a merged binary black-hole system is a Kerr black hole. Unlike this simple geometry, the black hole immediately after the merger is highly distorted. Multipole moments on dynamical and isolated horizons offer a natural avenue for describing the decay of this distortion. We construct a spatially gauge-invariant version of horizon multipole moments in the Spectral Einstein Code (SpEC), and explore their evolution in the ringdown phase. We also compare these moments to the waveform at null infinity, relating the strong field regime to the radiation zone.

Yitian Chen
Cornell University

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