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Nonspinning numerical relativity waveform surrogates: Building the model CHAD GALLEY, Caltech — Simulating binary black hole coalescences involves solving Einstein's equations with large-scale computing resources that can take months to complete for a single numerical solution. This engenders a computationally intractable problem for multiple-query applications related to parameter space exploration, data analysis for gravitational wave detectors like LIGO, and semi-analytical waveform fits. I discuss how reduced order modeling techniques are used to build accurate surrogates that can be evaluated quickly in place of numerically solving Einstein's equations for generating gravitational waveforms of nonspinning binary black hole coalescences. To within error, the surrogate can model all modes available from a numerical simulation including, for example, troublesome modes such as the (3,2) mode and memory modes. A companion talk will cover quantifying the best surrogate model's errors. The results of this work represent a significant advance by making it possible to use numerical relativity waveforms for multiple-query applications.

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