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Gravitational waves from boson stars and their potential signature in LIGO observations

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In this talk, we present long and high-precision numerical-relativity simulations of equal-mass boson star binaries. We inject the resulting waveforms into simulated LIGO noise and assess the capacity of present-day gravitational-wave detectors to detect such systems with standard analysis pipelines. We find that compact boson-star binaries are well recovered using black-hole binary approximants with Gaussian residuals, however, resulting in inaccurate parameter estimation. Fluffy boson-star binaries exhibit less degenracy with black-hole waveforms and, while also detected with significant SNR, leave a more conspicuous residual. We discuss consequences for modelling and observational efforts to use gravitational-wave observations in our quest for physics beyond the general-relativity-standard-model paradigm.