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Nonlinear Tides in Coalescing Binary Neutron Stars[1] NEVIN WEINBERG, Massachusetts Inst of Tech-MIT — Coalescing binary neutron stars are among the most promising sources for ground-based gravitational wave detectors such as Advanced LIGO. Tidal interactions in such systems extract energy from the orbit and, at some level, modify the gravitational wave signal. Previous studies found that tidal effects are probably too small to be detected from individual systems with LIGO. However, these studies typically assumed that the tide can be treated as a linear perturbation to the star. I will show that the linear approximation is invalid even during the early stages of inspiral and that nonlinear fluid effects in the form of tide-internal wave interactions become important around the time the binary first enters LIGO's bandpass (at gravitational wave frequencies around 30 Hz). Although the precise influence of nonlinear fluid effects is not yet well constrained, I will show that they may significantly modify the gravitational wave signal and electromagnetic emission from coalescing binary neutron stars.

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