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Gamma-ray burst standard sirens: Precision cosmology from gravitational waves DANIEL HOLZ, LANL, SAMAYA NISSANKE, Caltech/JPL, SCOTT HUGHES, MIT, NEAL DALAL, JONATHAN SIEVERS, CITA — It has long been hypothesized that at least some gamma-ray bursts are associated with the merger of binary neutron stars, or with the merger of a neutron star with a black hole. Recent observations have accumulated compelling evidence supporting this hypothesis, at least for short-hard gamma-ray bursts. These bursts should then be accompanied by a gravitational-wave signal corresponding to the ?nal inspiral of the compact binary. Simultaneous observation of the gravitational and electromagnetic waves from these bursts would allow us to directly and independently determine both luminosity distance and redshift to the binary, thereby providing an absolutely calibrated, high accuracy standard siren (the gravitational wave analog of a standard candle). We examine the cosmological measurements to be expected from observations of gamma-ray burst standard sirens with a ground-based gravitational wave detector network (including LIGO and Virgo, and possible extensions with AIGO and LCGT). We find that these measurements should be able to map the low-redshift Hubble ?ow with excellent accuracy.

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