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Determining the Hubble Constant from Gravitational-wave Observations of Merging Binary Neutron Stars and Electromagnetic Observations of Galaxies HONG QI, PATRICK BRADY, University of Wisconsin Milwaukee, CHRIS PANKOW, Northwestern University, DAVID KAPLAN, ANGELA VAN SISTINE, University of Wisconsin Milwaukee — Active research has been made in the past few decades on measuring the Hubble constant H_0. Most of the research use electromagnetic observations only. In our research, we propose a different method of determining the Hubble constant more accurately with both electromagnetic observations of galaxies and gravitational-wave observations of signals that happen in these galaxies. Our method is based on the method proposed by Bernard Schutz in 1986, in which one uses information from galaxy surveys as prior information for the location of a gravitational wave source. Since the first direct detection of gravitational waves in 2015, this approach has been made more supported and useful. We show how accurate we can constrain H_0 by combining the results from a couple of hundreds of simulated gravitational-wave observations of merging binary neutron stars from a network of two advanced interferometers. This accuracy will be expectedly dramatically improved when we use a network of three advanced detectors. We also show various systematic effects on the measurements of H_0 due to the incompleteness of galaxy catalog, the uncertainty in the measurements of the redshifts of galaxies, and so forth. We will also review the ongoing work.

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