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Gravitational-wave Astronomy with Stokes Parameters RAVI KUMAR KOPPARAPU, RUXANDRA BONDARESCU, RYAN PATRICK FISHER, LEE SAMUEL FINN, MEAGAN MARIE LANG, Penn State Univ, TIFFANY SUMMERSCALES, Andrews University — Polarization measurements have been used for a long time as a source diagnostic in traditional astronomy. Here, we determine the polarization state of a gravitational-wave (GW) by calculating the Stoke's parameters, and we combine these parameters to measure the degree of circular, linear, and elliptical polarization. In general, axisymmetric systems emit linearly polarized GW radiation; Non-axisymmetric systems emit circularly polarized GW radiation. Therefore, measurements of the degree of GW polarization can potentially be used to identify source structure and properties. We use maximum entropy deconvolution to recover injected GW signals, coherently combining the data from a network of detectors, such as the LIGO-VIRGO or the international pulsar timing array. We then compute the Stokes parameters of the recovered waveform and study the sky sensitivity to linear and circular polarization for a ground-based detector network. We investigate at what signal strength one can reliably recover source parameters from polarization measurements and how this recovery depends on sky location.

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