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Jet physics, ejecta properties and Hubble constant from the afterglows of neutron star mergers

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Radio afterglows of neutron star mergers are excellent probes of the fast ejecta (relativistic jets and fast tail of the dynamical ejecta) and provide strong constraints on the inclination angle, ejecta morphology and energetics. This information is complementary to the ejecta mass and composition derived from the early-time UV-optical-infrared emission (called the kilonova/macronova). Radio observations of GW170817 revealed an energetic and narrowly-collimated jet, similar to those seen in gamma-ray bursts, surrounded by a wider angle outflow (together called the structured jet or jet-cocoon). Very long baseline interferometric observations were especially important in constraining the geometry, thereby providing a (standard siren) measurement of the Hubble constant. I will present the latest results from GW170817 and discuss the prospects for detecting radio afterglows of mergers in the upcoming LIGO-Virgo-KAGRA observing runs.

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