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Multi-messenger time-domain astronomy: GW170817, current GW+EM searches, and the future

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On 2017 August 17, the field of gravitational-wave (GW) astronomy made the big leagues with a dazzling discovery. After several GW detections of black hole (BH)-BH mergers with no convincing electromagnetic (EM) counterparts, advanced LIGO and Virgo scored their first direct detection of GWs from a binary neutron star (NS) merger, an event dubbed GW170817. Soon after the GW discovery, GW170817 started gifting the astronomical community with an EM counterpart spanning all bands of the spectrum. With the on-going LIGO-Virgo third observing run, we are officially in the era of public GW alerts and the hunt is on for more multi-messenger detections. In this talk, I will review what we have learned from GW170817 focusing on its radio counterpart, what questions remain open, and what are the prospects for future EM plus GW studies of the transient sky.