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Multi-messenger Time-domain Astronomy: GW170817 and beyond

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The discovery of GW170817, a binary neutron star merger detected in gravitational waves with an electromagnetic counterpart, marked the birth of multi-messenger astronomy. Joint analyses of gravitational and electromagnetic radiation from such events significantly deepen and challenge current knowledge of the Universe. This knowledge will only continue to broaden and expand when next-generation facilities in both gravitational and electromagnetic waves. I will review the incredible discovery of GW170817, emphasizing areas of opportunity for the next generation Very Large Array, such as radio polarimetry and mapping of the merger ejecta, and host galaxy studies. Finally, I will discuss the potential for future multi-messenger discoveries of binary black holes and relativistic stellar explosions.