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Coupling Gravitational Waves and Light: Lessons Learned and Future Prospects

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As demonstrated by the historic discovery and follow-up campaigns of the first neutron star merger, GW170817, future multi-messenger observations coupling gravitational waves and light hold the promise of precise localizations, thus enabling the determination of precise redshifts, the nature of their outflows, and properties of the environment on sub-parsec to kiloparsec scales. Here, I will discuss lessons learned from follow-up campaigns in O3 and prospects for the detection of future such multi-messenger detections, matched to current and planned electromagnetic facilities, as well as potential future capabilities.