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Quantum sensors and their networks as exotic field telescopes in multi-messenger astronomy

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I will focus on exotic bosonic fields potentially sourced by powerful astrophysical events, such as binary neutron star and binary black hole mergers. Because such hypothetical fields are predicted to feebly interact with standard model particles and fields, we propose to employ precision quantum sensors to detect potential bursts of such exotic fields. We show that to unambiguously correlate such bursts with gravitational wave triggers, the fields must be ultralight and ultrarelativistic. Moreover, networks of precision sensors are required to resolve the progenitor position in the sky thereby establishing a crucial coincidence with the more conventional, e.g., electromagnetic or gravitational wave, observations of the source. We show that within certain models, atomic clocks and magnetometers can be sensitive to intense bursts of exotic fields from astrophysical sources within the reach of current gravitational wave observatories. This opens an intriguing possibility for a novel, exotic physics, modality in multi-messenger astronomy.