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Ultrahigh energy cosmic rays from neutron-star mergers

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In the context of the recent multi-messenger observation of neutron-star merger GW170817, we examine whether such objects could be sources of ultrahigh energy cosmic rays. At first order, the energetics and the population number is promising to envisage the production of a copious amount of particles, during the first minutes to weeks from the merger. On the other hand, the strong radiative environment in the kilonova ejecta can be an important background causing energy losses for cosmic-ray nuclei but also the emission of associated high-energy neutrino signatures. We model the evolution of the photon density in the kilonova ejecta and calculate numerically its impact on ultrahigh energy astroparticle spectra.

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