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## The Pierre Auger Observatory and Multi-Messenger Physics

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The discovery of gravitational waves and the observation of cosmic-derived neutrinos led to the birth of multi-messenger astronomy. Gravitational waves, neutrinos, photons, cosmic rays will be simultaneously studied to investigate the highest energy phenomena in the Universe. The Pierre Auger Observatory, designed for the detection of ultra high energy cosmic rays, can search for primary photons and for neutrinos with energy above 100 PeV from pointlike sources across the sky with equatorial declination from about  $-65^\circ$  to  $+60^\circ$ . Neutrino candidates are searched among inclined showers detected. A targeted search for neutrinos yielded no candidates in the Auger data collected within  $\pm 500$  s around or 1 day after the UTC time of GW150914 and GW151226, as well as in connection with the GW candidate event LVT151012. The nonobservation led to constrain the amount of energy radiated in neutrinos from these events. No candidates consistent with the source were found also in the follow-up searches of GW170817. The Auger Collaboration is working on the improvement of neutrino search, as well as on photon search, and is always ready to respond to alerts from GW experiments.

### Collaboration name

Pierre Auger Collaboration

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