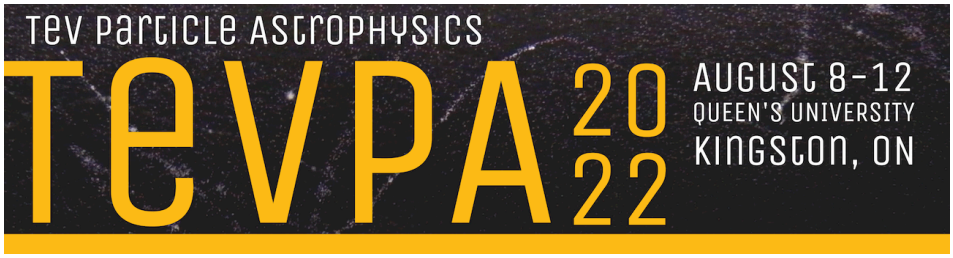

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Prediction of high-energy neutrino signals associated with gravitational waves: effects of kilonova photons

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GW170817 revealed that binary neutron star mergers are accompanied by jets, which are the origin of short gamma-ray bursts (sGRBs), but the production mechanism and dissipation regions of the jets are still unknown. The X-ray lightcurves of sGRBs have extended emission components lasting for 100-1000 seconds, which are considered to be evidence of prolonged engine activity of the jet. Jets by prolonged engine activity should propagate inside the ejecta of neutron star mergers and interact with photons of kilonova, an optical transient powered by radio-active decay of neutron-rich elements. We calculate neutrino emission from jets by prolonged engine activity, considering interaction between kilonova photons and cosmic rays accelerated in jets. We find that observation of neutrino signals associated with gravitational waves are highly probable for 10-years of operation by the future project, IceCube-Gen2 with second generation gravitational wave detectors. Also, we show that probability to observe such neutrino signals does not depend on the Lorentz factor of the jets, and we can constrain the values of dissipation radius of jets by neutrino signals.

Collaboration name

Primary author: MATSUI, Riki

Co-authors: KIMURA, Shigeo; TOMA, Kenji

Presenter: MATSUI, Riki

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