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## Testing magnetars as sources of VHE and UHE cosmic rays with IceCube

*Saturday, August 1, 2015 3:30 PM (1 hour)*

The electromagnetic wind of a fast-spinning magnetars has been proposed as a site for cosmic rays acceleration from very high energies (VHE) to ultrahigh energies (UHE). We show how high-energy neutrinos would be produced in these scenarios, when the accelerated particles interact with the baryons of the expanding supernova ejecta and the radiation fields in the pulsar wind nebula. In this talk, we make use of the current IceCube sensitivity in diffusive neutrino background, in order to constrain the parameter space of the most extreme neutron stars as sources of VHE and UHE cosmic rays. We demonstrate that the current non-observation of EeV neutrinos put stringent constraint on the birthrates, ejecta mass and acceleration efficiency of the magnetar sources. Assuming a proton cosmic ray composition, we find that the IceCube sensitivities almost exclude any contribution from these sources. Furthermore, we consider scenarios where a fraction of cosmic rays can escape from the jets without significant interactions. We show that even in these scenarios, the IceCube upper limits still partially constrain magnetars as sources as UHECRs.

### Collaboration

– not specified –

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