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The observation of a neutrino from the Tidal Disruption Event AT2019dsg: a concordance model

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We present a phenomenological concordance scenario with a relativistic jet for the Tidal Disruption Event (TDE) AT2019dsg, which has been proposed as source of the astrophysical neutrino event IceCube-191001A. Noting that AT2019dsg is one of the brightest (and few) TDEs observed in X-rays, in our work we connect the neutrino production with the X-rays: an expanding cocoon causes the progressive obscuration of the X-rays emitted by the accretion disk, while at the same time it provides a sufficiently intense external target of back-scattered X-rays for photo-pion production off protons. We also describe the late-term emission of the neutrino (about 150 days after the peak), by scaling the production radius with the black body radius. Our energetics and assumptions for the jet and the cocoon are compatible with expectations from numerical simulations of TDEs. About 0.26 neutrino events are predicted in the right energy range in IceCube.

Collaboration name

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