

The blazar origin of the KM3-230213A ultra high energy neutrino event

The source of the remarkable ultra high energy neutrino event KM3-230213A detected with the KM3-ARCA array is still not established. A persistent isotropic source hypothesis is disfavored due to the non-observation of a similar event by the larger IceCube detector that benefits from \sim an order-of-magnitude larger observation time compared to the KM3-ARCA array as well.

We consider two possible sources of the KM3-230213A event, namely, the blazars PKS 0605-085 and MRC 0614-083. PKS 0605-085 is a powerful flat-spectrum radio quasar (FSRQ) at the redshift $z = 0.87$ located at 2.4° from the reconstructed direction of the KM3-230213A event. In particular, we consider a scenario where the neutrino is produced on the external photon field provided by the outer layer (the “sheath”) of the “spine-sheath” jet structure. In this case, the blazar PKS 0605-085 appears to be among the most probable sources of the KM3-230213A event.

The blazar MRC 0614-083 is located at 0.6° from the reconstructed direction of the KM3-230213A event. We consider a hypothesis that MRC 0614-083 is actually an extreme TeV blazar. In this case, MRC 0614-083 is a viable candidate source of the KM3-230213A event.

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Session Classification: Cosmic rays (nuclei, gammas, neutrinos) of very high energies (> 100 TeV)

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