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Reconstruction of neutral current interactions by atmospheric neutrinos in JUNO

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Jiangmen Underground Neutrino Observatory (JUNO) is a large-scale neutrino experiment located 700 meters underground in Southern China. JUNO is capable of detecting multiple types of neutrinos including atmospheric neutrinos which can undergo both charged current (CC) and neutral current (NC) interactions in the detector. In addition to the standard 3-flavor oscillation measured by CC interactions, the measurement of NC interactions induced by atmospheric neutrinos could potentially provide evidence for the existence of additional neutrino flavors that mix with the active 3 flavors. This measurement requires identification of NC events against CC events and other backgrounds. Besides, since the neutrino oscillation baseline length varies with the neutrino incident angle, directionality measurement for NC events could further increase the experiment's sensitivity. This poster introduces the recent progress of identifying and reconstructing atmospheric neutrino NC interactions in JUNO with Monte Carlo studies. In particular, a novel approach developed for the reconstruction of NC event's directionality utilizing the event vertex and neutron-capture positions is presented.

Author: WANG, jiabin (Shandong University)

Presenter: WANG, jiabin (Shandong University)

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