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Nuclear emulsion in neutrino precise measurements.

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We report on the nuclear emulsion production facility and several neutrino and related experiments using nuclear emulsion produced at the facility. NINJA: neutrino study in GeV and sub GeV energy range at J-PARC, DsTau: tau neutrino production study in CERN SPS 400 GeV proton interactions, FASERnu and SND at LHC: high energy neutrino production/interaction study in forward from LHC collisions. This time, we will focus on the performance in high energy experiments. The spatial and angular resolution of nuclear emulsion is suitable for short lived particle analysis like charms or tau particles. By tracking in the nuclear emulsion, an electron pair and an electron track can be recognized without mixing each other, then electron neutrinos can be identified almost free from NC+pi0 or background. The experiments using emulsion films can detect all three types of neutrinos separately through their CC interaction. The charm production studies in hadron interactions or neutrino interaction is subject of the experiments. In this talk, we will present the performance of our nuclear emulsion product by B02 group in Grant-in-Aid for Scientific Research on Innovation Areas "Exploration of Particle Physics and Cosmology with Neutrinos".

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