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Preliminary results from the first NINJA physics run

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We present preliminary measurements on ν_μ charged-current interactions on water, obtained from the first physics run of the NINJA experiment. The interactions were recorded using nuclear emulsion detectors with a 75 kg water target exposed to a J-PARC ν_μ beam of mean energy 0.86 GeV and a total exposure of 4.8×10^{20} protons on target. The sub-micrometer spatial resolution of the emulsion detectors enables exceptionally low momentum thresholds —200 MeV/c for protons and 50 MeV/c for pions.
The results include final-state muon, proton, and pion multiplicities and kinematic distributions, based on 70% of the fiducial volume, restricted to the central region of the target with minimal background contamination. We also discuss the potential of the full NINJA dataset to provide valuable input for modeling GeV-scale neutrino–nucleus interactions, in support of current and next-generation long-baseline oscillation experiments.

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