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Improvement of the J-PARC neutrino beam for a lepton CP violation search.

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The J-PARC neutrino beam-line generates a high intensity neutrino beam, using 30 GeV protons from the J-PARC MR accelerator, for the long-base line neutrino oscillation experiment T2K. T2K observed neutrino oscillations between muon neutrinos and electron neutrinos in 2013, and started the search for oscillations between muon anti-neutrinos and electron anti-neutrinos using a ~400kW proton beam. The refurbishment of the J-PARC MR planned in 2018 and recent progress of its tuning will assure the achievement of the design beam power, 750kW, and further beam power improvement above 1MW in the near future is promising. We will present improvements of the J-PARC neutrino beam-line made in order to generate a neutrino beam using a few MW proton beam so that T2K can search for evidence of CP violation in the lepton sector.

We will describe the production and implementation of key components, such as the handling system of the extracted protons, the production target, radioactive waste treatment, etc. The improvement of the neutrino beam intensity by increasing the magnetic field of the pion focusing system will also be discussed.

Primary author: NAKADAIRA, Takeshi (HIGH ENERGY ACCELERATOR RESEARCH ORGANIZATION, KEK)

Co-authors: NAKAYOSHI, Kazuo (KEK High Energy Accelerator Research Organization); SAKASHITA, Ken (High Energy Accelerator Research Organization(KEK), Institute of Particle and Nuclear Study); Prof. TADA, Masaru (KEK); Prof. FRIEND, Megan (KEK); Ms MAYA, Nishida (KEK); ISHII, Takanobu (KEK); KOBAYASHI, Takashi (KEK); ISHIDA, Taku (KEK); SEKIGUCHI, Tetsuro (KEK); FUJII, Yoshiaki (High Energy Accelerator Research Organization (KEK)); OYAMA, Yuichi (KEK)

Presenters: SAKASHITA, Ken (High Energy Accelerator Research Organization(KEK), Institute of Particle and Nuclear Study); Prof. FRIEND, Megan (KEK); KOBAYASHI, Takashi (KEK); NAKADAIRA, Takeshi (HIGH ENERGY ACCELERATOR RESEARCH ORGANIZATION, KEK); ISHIDA, Taku (KEK); SEKIGUCHI, Tetsuro (KEK)

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