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Upgraded J-PARC neutrino beamline and prospects for further increase of beam power

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The Tokai-to-Kamioka (T2K) long-baseline neutrino oscillation experiment entered a new phase with enhanced neutrino beams. J-PARC neutrino beam is produced from decayed pions and kaon created by interaction with proton beams at a graphite target. To provide a higher intensity accompanying the J-PARC main ring accelerator upgrade, the J-PARC Neutrino beamline group upgraded and exchanged beamline instruments like beam monitors, electromagnetic horns and target. Beam commissioning was started in November 2023 after the long shutdown for the upgrade works in 2021-2022. We have successfully achieved a record beam power of about 760 kW, which is an increase of more than 40% compared to that before the upgrade and greater than the initial design beam power. While supplying the beam for the T2K experiment, we aim for further increase of the beam power to 1.3 MW. It is also a key in the next generation of neutrino research, Hyper-Kamiokande, toward unraveling the mystery of the missing antimatter from our universe. In this poster, we present our successful achievement of a record beam power with the upgraded J-PARC neutrino beamline and future prospects toward the realization of higher beam power.

Poster prize

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