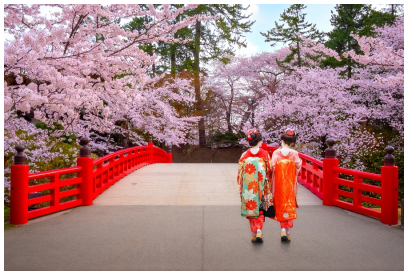

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Atmospheric neutrino reconstruction and oscillation analysis with neutron detection in SK-Gd

Super-Kamiokande (SK) is the 50 kton water Cherenkov detector located at Kamioka mine in Japan. In 2020, we dissolved gadolinium sulfate in the SK water and started SK-Gd phase with 0.01% Gd, where neutron detection efficiency and resolution for neutron capture vertex are improved. Detection efficiency got even higher at the second Gd loading to 0.03% Gd in June 2022. In atmospheric neutrino oscillation analysis, aiming mainly at mass ordering determination, SK-Gd will benefit (i) neutrino / anti-neutrino discrimination, (ii) neutrino energy correction with number of detected neutrons, (iii) neutrino energy and direction correction with neutron vertex. We will report how sensitivities can be improved in oscillation study in SK-Gd.

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