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First result of a search for astrophysical electron antineutrino in SK-Gd experiment

Since 2020, Super-Kamiokande (SK) detector has been updated by loading gadolinium (Gd) as a new experimental phase, 'SK-Gd.' In the SK-Gd experiment, event selection with delayed coincidence using neutron capture signal, such as inverse beta decay of electron antineutrinos, is improved thanks to high cross-section and high energy gamma-ray emission of thermal neutron capture on Gd.

In July 2022, the observation with 0.01% of Gd mass concentration was completed, and currently, an updated phase with 0.03% mass concentration is in operation. We report the first result of a search for astrophysical electron antineutrinos flux for the energy range of $O(10)$ MeV in SK-Gd with a 22.5×552 kton \times day exposure at 0.01% Gd mass concentration. Finally, the future prospect for the DSNB search in SK-Gd is discussed.

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