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First result of a search for Diffuse Supernova Neutrino Background in SK-Gd experiment

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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, low-energy electron antineutrinos via inverse-beta decay can be searched with efficient neutron identification thanks to high cross-section and high energy gamma-ray emission of thermal neutron capture on Gd. Until July 2022, the observation is operated with the 0.01% Gd mass concentration. The neutron capture fraction on Gd is about 50% at that time. We report the first search result for the flux of astrophysical electron antineutrinos for the energy range of O(10) MeV in SK-Gd with a 22.5×552 kton·day exposure at 0.01% Gd mass concentration of the initial stage of SK-Gd.

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