

Search for Proton Decay via $p \rightarrow e^+ \pi^0$ and $p \rightarrow \mu^+ \pi^0$ in 450 kiloton-years Exposure of the Super-Kamiokande Detector

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Super-Kamiokande is a 50 kton water Cherenkov detector in Japan. One of the main physics goals is to test Grand Unified Theory by searching for proton decay. The $p \rightarrow e^+ \pi^0$ and $p \rightarrow \mu^+ \pi^0$ decay modes are the most prospective because they are predicted in many theories, and because of their unique event topologies, signal and atmospheric neutrino background events that can be clearly discriminated experimentally. Super-Kamiokande has been operating from April 1996 and accumulated a large amount of data with a great potential for discovery. In order to further improve the search sensitivity, we have enlarged the fiducial mass of the Super-Kamiokande detector by 20% and added 25% more exposure by livetime update since the last published results in 2017, resulting in 1.5 times larger statistics. In this talk, the latest proton decay search results, especially via $p \rightarrow e^+ \pi^0$ and $p \rightarrow \mu^+ \pi^0$ modes with the larger fiducial mass will be presented.

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