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Search for Nucleon Decays in Super-Kamiokande

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Grand Unified Theories (GUTs) is motivated by merging of the coupling constants of the strong, weak, and electromagnetic forces at a large energy scale ($\sim 10^{16}$ GeV), which is out of the reach of accelerators. One of the other general features of GUTs is that they allow lepton and baryon number violations and they predict instability of

nucleons. Then nucleon decay experiments are the direct probe for GUTs.

The Super-Kamiokande (SK) is a water cherenkov detector which keeps running to detect nucleon decays with large mass. There are no other nucleon decay detectors which have as long exposure as SK. The results of nucleon decay search based on 173 kton year (1996-2008) will be presented in the conference. The favored decay mode in GUTs based on SU(5) symmetry is $p \rightarrow e^+ \pi^0$. On the other hand, $p \rightarrow \nu K^+$ is favored by SUSY GUTs model. Those two modes will be mainly discussed.

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