



Recent result on search for nucleon decay and neutron-antineutron oscillation in Super-Kamiokande

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We present recent results of the search for baryon number violating phenomena predicted by GUTs in Super-Kamiokande covering nucleon decay and neutron-antineutron oscillation.

Grand Unified Theories (GUTs) seek to unify the strong and electroweak forces, and a unique prediction of the GUTs is baryon number violation. Two quarks in a nucleon can transform into a lepton and an antiquark resulting in a lepton plus meson final state.

Super-Kamiokande (SK) is ring imaging water Cherenkov detector, containing 50 ktons of ultra-pure water, located in Kamioka-town in Gifu prefecture, Japan.

The Super-Kamiokande experiment had started observation in 1996, and we collected data in four periods: SK-I (91.7kton year exposure), II (49.2 kton yr), III (31.9kton yr) and IV (on-going).

We present the results on search for p

$\rightarrow e^+ + \pi^0, p$

$\rightarrow \mu^+ + \pi^0, \text{ and } p$

$\rightarrow \nu +$

K^+ based on SK-I to SK-IV data (219.8 kton yr exposure).

The other nucleon decay modes to meson plus anti-leptons are also presented based on SK-I, SK-I+II, or SK-I+II+III data.

Another possibility allowed by some of GUTs and Super Symmetric models is that neutron spontaneously changes to antineutron (called neutron-antineutron oscillation).

We plan to present the final result of neutron-antineutron oscillation search in SK-I.

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