

# Workshop on Grand Unified Theories: Phenomenology and Cosmology (GUTPC)

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## Overview of Proton Decay Search Experiments

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Grand Unified Theories (GUTs) generically predict direct transition processes between quarks and leptons, and searching for proton decay is one of the unique ways to directly test GUTs. For most of the proton (and neutron) decay modes, the current lifetime limits are set by the Super-Kamiokande (Super-K) experiment, whose detector is the world's largest underground water Cherenkov detector. Besides the Super-K experiment, a few underground experiments are planned to start their data-taking in this decade, Hyper-K in Japan, DUNE in the U.S., and JUNO in China. Hyper-K is also an underground water Cherenkov detector with roughly 8 times larger water fiducial mass than Super-K, while the DUNE detector is equipped with liquid argon with a mass of about 40 kton and the JUNO detector consists of a 20-kton liquid scintillator. This talk will cover the basic proton decay search principles, current experimental status, and future expected sensitivities in those experiments.

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