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Proton Decay projects in Europe

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ABSTRACT

Super-Kamiokande and its predecessor Kamiokande are among the most successful experiments of modern physics. They have provided crucial measurements of solar, atmospheric, Supernova and beam neutrinos and have dramatically increased the sensitivity to proton decay lifetime, constraining possible GUT theoretical models. This success was possible thanks to the large target mass. To go even further one needs to bring at least an order of magnitude improvement either in the sheer size and/or conceive detectors with improved detection techniques. LAGUNA – Large Apparatus studying Grand Unification and Neutrino Astrophysics – offers a realistic path towards that goal in Europe. The recently completed FP7 Design Study has investigated seven potential sites and three detector options: GLACIER (liquid argon Time Projection Chamber), LENA (liquid scintillator) and MEMPHYS (water Cherenkov). The project has now entered the second phase, also funded by FP7, where it will determine the full cost of construction, commissioning and long-term operation of the infrastructure, and assess the feasibility of CERN beams for long baseline neutrino oscillation physics. The talk will summarize the findings of the Design Study concerning the advantages of each site and discuss the main physics arguments, including the sensitivity to proton decay.

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