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Università
degli Studi
della Campania
Luigi Vanvitelli



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Combined Super-Kamiokande and KamLAND pre-supernova alarm

The Super-Kamiokande (SK) and the Kamioka Liquid-scintillator Antineutrino Detector (KamLAND) experiments are neutrino observatories located in the Kamioka mine in Japan. A pre-supernova (preSN) alarm has been launched by SK in 2021, aimed at detecting neutrinos produced during the silicon-burning phase of massive stars before a core-collapse supernova (CCSN) occurs. Since 2015, KamLAND has been running its own preSN alarm. Detecting preSN neutrinos will not only provide early warnings for nearby CCSNs, but it will also help understand the processes leading to them and determine the neutrino mass hierarchy. In order to improve the sensitivity of preSN neutrinos and to extend early warning to CCSN, SK and KamLAND have launched a joint alarm system. The details of the joint alarm are presented as well as the expected increase in sensitivity for combining the results from both experiments.

Presenter: NASCIMENTO MACHADO, Lucas (Glasgow University, UK)

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