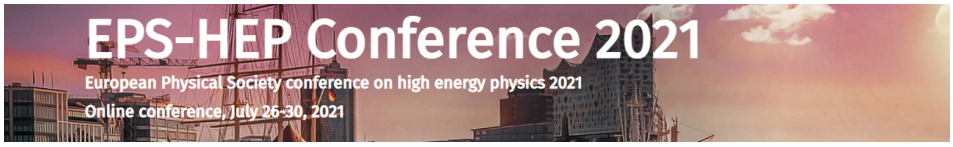

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MeV electron- neutrino and antineutrino spectrometer with LiCl and GaCl

The flavor transition of solar neutrinos is governed by the vacuum MNS mixing parameters and MSW matter effect, however, the transition from matter- to vacuum-dominated energy region, i.e. the upturn, has not been experimentally observed. It left open questions for light sterile neutrinos or non-standard-model interactions. The solar neutrino spectrum predicted by the solar model also bears large experimental uncertainties. Geoscience achieved by neutrino observatories has just started, more data is urged. In this talk, I will introduce our recent experimental study of LiCl and GaCl liquid scintillators. Lithium-7 has shown a high-cross-section low-threshold feature for electron-neutrino detection and energy measurement through charged current interaction. Gallium-71 has shown an interesting delayed-coincidence feature for electron-neutrino detection and energy measurement. Chloride-35 and Lithium-6 have shown that detection of electron-antineutrino with delayed-coincidence technique is possible. We investigated the physical property of LiCl and GaCl on solubility, U, Th, K removal, natural abundance, and attenuation length. We have tried to produce a water-based liquid scintillator including LiCl and GaCl. We find that LiCl aqueous solution is good media for MeV electron-neutrino and antineutrino spectrometer and rather efficient in measuring the upturn, solar sterile neutrinos, and geoneutrinos. Some features are unique and cannot be achieved by a traditional water-Cherenkov or liquid scintillator detector, and some features can cause a compact size for a detector.

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Collaboration / Activity

None

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