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Solar neutrino detection in liquid xenon via charged-current scattering to excited states SCOTT HASELSCHWARDT, Lawrence Berkeley National Laboratory, BRIAN LENARDO, Stanford University, PEKKA PIRINEN, JOUNI SUHONEN, University of Jyvaskyla — In this talk I discuss the prospects for real-time detection of solar neutrinos via the charged-current neutrino-nucleus scattering process in liquid xenon time projection chambers. A nuclear shell model is used to calculate the cross sections for populating specific excited states of the caesium nuclei produced by neutrino capture on ^{131}Xe and ^{136}Xe. The model is further used to compute the decay schemes of the low-lying 1^+ excited states of ^{136}Cs, for which there is sparse experimental data. The possibility of tagging the characteristic de-excitation γ-rays/conversion electrons using two techniques is explored: spatial separation of their energy deposits using event topology and their time separation using delayed coincidence. It is found that the topological signatures are likely to be dominated by radon backgrounds, but that a delayed coincidence signature from long-lived states predicted in ^{136}Cs may enable background-free detection of CNO neutrino interactions in next-generation experiments. We also estimate the sensitivity for detecting the solar-temperature-induced line shift in ^{7}Be neutrino emission, which may provide a new test of solar models.

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