PPD Seminar

Deployment of the SoLid Neutrino Detector at the BR2 Nuclear Reactor

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SoLid searches for sterile neutrinos at the SCK•CEN-BR2 reactor in Mol, Belgium. Inverse beta decay interactions between reactor neutrinos and the detector result in a positron and neutron that are coincidental and correlated in space. To take advantage of these correlations, the detector uses a highly segmented design of 12,800 cells, each composed of two scintillators: PVT cubes 5cm cubes and 6LiF:ZnS(Ag) phosphor screens, enabling the detection and localisation of both neutron and electromagnetic signals. The cubes are read out using a 2D grid of 3,200 wavelength shifting fibres coupled to Silicon Photomultipliers. The need to operate the detector on the surface near a reactor, combined with the vast number of detector channels, introduces challenges during data taking. This seminar presents the construction and deployment of the detector in 2017. Sophisticated online data reduction techniques are presented, including novel trigger algorithms, that are required to optimise the sensitivity of the experiment whilst achieving a manageable output data-rate. Initial results of the neutrino signal will be presented.