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Charge and time signal modelization in large liquid scintillator detectors; the SNO+ Neutrino Physics Experiment

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In large volume liquid scintillator detectors scintillation is registered by the large number of the photomultiplier tubes (PMTs) more or less uniformly distributed around the active volume of the detector. For each event the charge and time of the signal arriving is measured at each PMT of the detector. On the base of this information the energy and position of each event is reconstructed and used in further analysis.
In this project, a numerical method will be developed to provide numerical estimations of the charge and temporal signals arriving to detector photomultipliers. The method shall include all the physics processes associated to light propagation in the detector volume, as emission, absorption/re-emission and scattering without Monte Carlo simulations. Its application to particle reconstruction and identification will be studied. The method is to be applied to the SNO+ detector.

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