Measurement of Liquid Scintillator Nonlinearity

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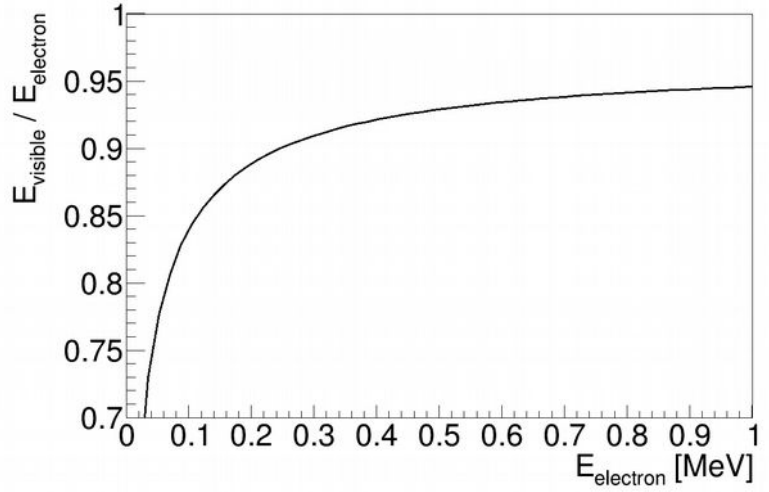
Liquid Scintillator Nonlinearity

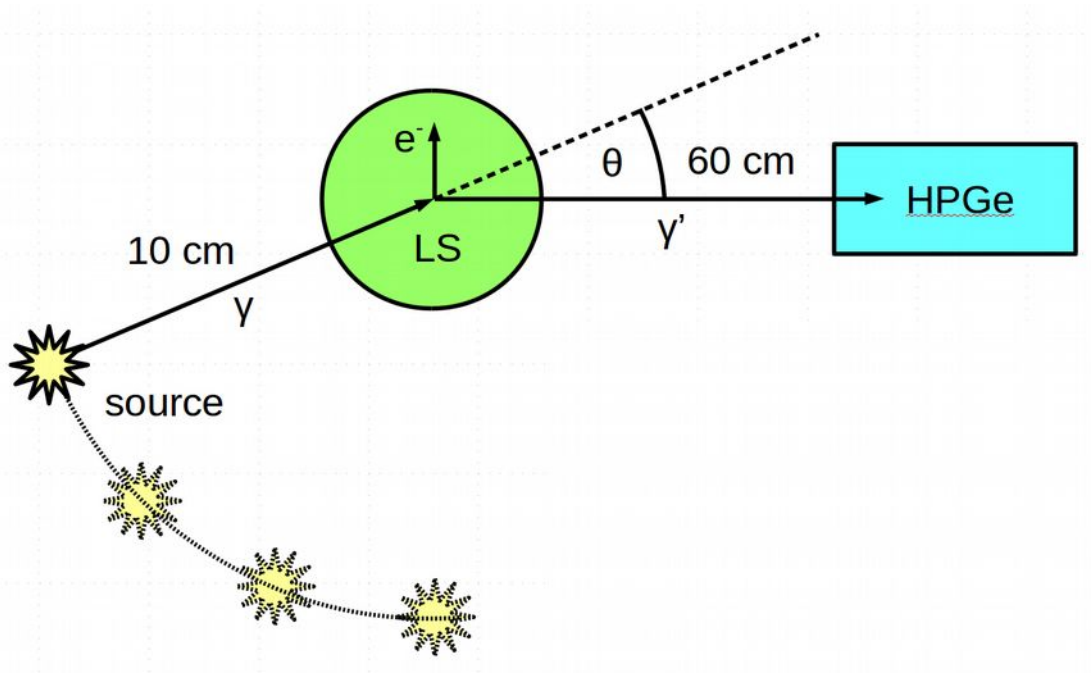
- In liquid scintillators, the dependence of the amount of scintillation light on the energy deposited by the incident particle is not exactly linear

Example for electron:



- Knowledge of nonlinearity is important for reactor neutrino experiments that commonly use liquid scintillators

Experimental Setup



- Gamma of known energy scatters in the liquid scintillator
- Recoiled electron energy measured in the liquid scintillator
- Scattered gamma energy measured by HPGe detector
- Results are compared

Data Analysis & Preliminary Results

- Several samples measured, liquid scintillator nonlinearity observed in all of them
- There are many detector-induced effects which need to be addressed (detectors' own nonlinear responses, temporal instability, light collection & PMT efficiency nonuniformity etc.)
- Example of results: