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First GEANT4-based Simulation investigation of a Li-coated Resistive Plate Chamber for Low-Energy Neutrons

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A simulation study of the performance of a single-gap resistive plate chamber coated with Li- layer for the detection of low energy neutrons was performed by means of GEANT4 Monte Carlo code. Low energy neutrons were detected via ^{7}Li(n,α) ^{3}He nuclear reaction. To make the detector sensitive to low energy neutrons, Li-coating was employed both on the forward and backward electrodes of the converter. Low energy neutrons were transported onto the Li-coated RPC by GEANT4 MC code. The detector with convertor area of 5 x 5 cm^{2} was utilized for this work. The detection response was evaluated as a function of incident low energy neutrons in the range of 25 meV to 100 meV. The evaluated results predicted higher detection response for the backward-coated converter detector than that of forward-converter coated RPC setup. This type of detector can be useful for the detection of low energy neutrons.

Primary author: Prof. RHEE, June-Tak (Konkuk-University)

Co-authors: Dr JAMIL, M. (Institute for Advanced Physics, Dept. of Physics, Konkuk University); Prof. JEON, Y.J. (LCD Research Lab; Department of Chemistry, Konkuk University)

Presenter: Prof. RHEE, June-Tak (Konkuk-University)

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