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Alpha Quenching Factor in Liquid Argon

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The DEAP-3600 (Dark matter Experiment using Argon Pulse shape discrimination) experiment located at SNO-LAB utilizes liquid argon as a target material. It searches for the scintillation light signal induced by Weakly Interacting Massive Particle (WIMP) candidates of dark matter via spin-independent interactions. For the DEAP-3600 detector, alpha particles are one of the intrinsic backgrounds which originate primarily from short- and long-lived radon (^{222}Rn) progeny. In order to identify and mitigate alpha-induced backgrounds, the quenching of alpha particles in liquid argon must be understood. In this work we performed a relative measurement of alpha quenching using scintillation light signals in the high energy region (order of MeV). We have probed the uncertainty of extrapolating the quenching factor to the low-energy region. Details of the analysis procedure and fits to Birks' law for alpha quenching will be presented here.

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