

Scintillating Bubble Chamber Silicon Photomultiplier Pulse Analysis

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The Scintillating Bubble Chamber (SBC) is a next generation dark matter detector that utilizes silicon photomultipliers to veto background electron recoil induced events. The silicon photomultipliers detect incoming scintillating photons, and the resulting pulses are analyzed through computational methods. Specifically, we contrasted traditional algorithmic methodologies with supervised machine learning approaches to determine which methodology yields the highest accuracy. Additionally, an unsupervised machine learning clustering algorithm was used to target single pulse events to boost current pulse analysis algorithms. All produced computational methods aim to reduce background when identifying dark matter related events.

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