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A maximum likelihood analysis of the CoGeNT public dataset

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The CoGeNT collaboration has released more than 3 years of data including the spectrum and time variation of the nuclear candidate events in their germanium detector. We perform an unbinned, maximum likelihood fit to the data, accounting for known backgrounds and systematic effects to search for dark matter interactions with the detector. Background and possible signals are characterized by two dimension probability distribution functions that account for energy and possible temporal variation. Additionally, we utilize the pulse rise time to model the “surface events” which are a known contamination of the bulk events where a dark matter signal should appear. We test several possible dark matter velocity distributions including the standard halo model employed by most direct detection experiments as well as more directional streams. The current status of this analysis will be presented.

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