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A cryogenic witness detector for low-energy neutron backgrounds

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My group is developing a prototype liquid ^3He -based scintillation detector with a TES readout to precisely measure neutron fluxes in low-background experiments. Until now, efforts to determine neutron backgrounds focus around simulations of the neutron environment without experimental comparison. The high sensitivity to low-energy neutrons provided by the $^3\text{He}(n,p)$ process makes our prototype more sensitive to neutrons than typical dark matter or neutrino-less double-beta experiments. Furthermore the prototype is suitable for operation in a cryogenic environment similar to those used for many low-background efforts. I will discuss the prototype effort and seek feedback from the community on design and physics issues.

Early Career

Yes

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