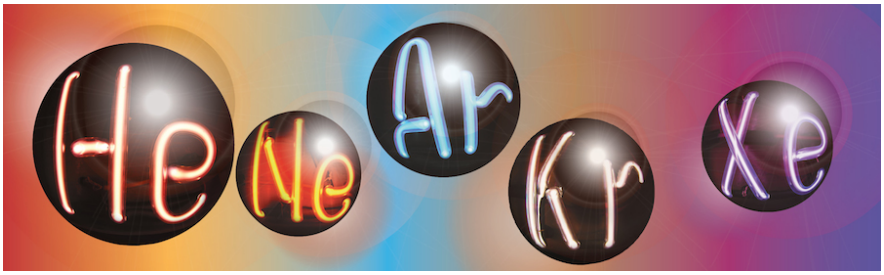

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The Scintillating Bubble Chamber: Overview and Status

Friday, 23 September 2022 11:15 (15 minutes)

As conventional liquid noble experiments push towards lower energy thresholds, separation between electron and nuclear recoils becomes increasingly difficult. The Scintillating Bubble Chamber (SBC) Collaboration is combining the well-established bubble chamber and liquid argon scintillator technologies, building a detector specifically suited to quasi-background-free measurement of low energy nuclear recoils. This relies on the principle that nuclear recoils cause bubble formation (nucleation), while electron recoils do not. SBC plans to operate at nucleation thresholds as low as 100 eV, while the scintillation signal will be used to tag and reject higher energy nucleation events. This yields performance suitable for a competitive WIMP dark matter search in the 1GeV mass region and sensitivity to reactor CEvNS. Currently the collaboration is constructing two similar chambers: one for calibration data at Fermilab and a second low background version to be operated at SNOLAB. The active volume consists of 10kg of superheated liquid argon contained within two fused silica vessels, surrounded by 32 silicon photomultipliers for scintillation light detection. SBC also plans to investigate performance with xenon doped liquid argon and to study the effects of electric field on nucleation efficiency. This talk will discuss detector function, current status and calibration techniques, along with the advantages and challenges unique to SBC.

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