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The Scintillating Bubble Chamber (SBC) Experiment for Dark Matter and Reactor CEvNS

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The Scintillating Bubble Chamber (SBC) experiment is a novel low-background technique aimed at detecting low-mass (0.7-7 GeV/c2) WIMP interactions and coherent scattering of reactor neutrinos (CEvNS). The detector consists of a quartz-jar filled liquid Argon (LAr), which is spiked with 100 ppm of liquid Xenon (LXe) acting as a wavelength shifter. The target fluid is de-pressurized into a super-heated state by a mechanically controlled piston. Particles interacting with the LAr+100ppmLXe can generate heat (bubbles) and scintillation light, depending on the energy intensity and density. The detector is further equipped with cameras to take pictures of the bubbles, Silicon-Photo-Multipliers to measure the scintillation light, and piezo-acoustic sensors to listen to bubble's formation. By combining these observables, the SBC detector is aiming to reach a threshold for nuclear recoils of 100 eV and a projected WIMP-sensitivity of 3.0x10-43 cm2, for a WIMP mass of 0.7 GeV/c2.
In this talk, I will present the design of the SBC experiment and provide an update on the ongoing construction and commissioning at Fermilab. Finally, I will discuss the collaboration's plans for the SNOLAB installation/operation and the reactor CEvNS search.

Secondary track (number)

Primary author: GIAMPA, Pietro

Presenter: GIAMPA, Pietro

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