

A Phase III SIMPLE Measurement ?

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SITUATION



The Phase II SIMPLE measurements were executed in two Stages of 15 SDDs each, each stage comprising ~ 0.2 kg active mass, over periods of ~ 100 days without recompression.

The surrounding neutron shielding provided an on-detector background rate estimate of 0.253 evt/kgd, mainly from the water-shield.

(see Felizardo: Dark Matter W6 on Wednesday afternoon)

a SIMPLE SDD, containing 0.01-0.02 kg of C_2ClF_5 .

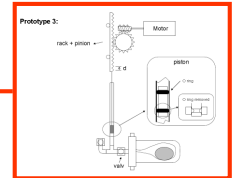
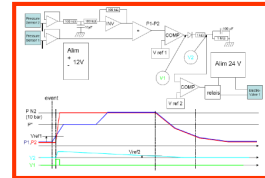
Need to conduct larger exposure measurements over shorter observation times in a background neutron field of $\leq 10^{-5}$ evts/kgd.

SOLUTION

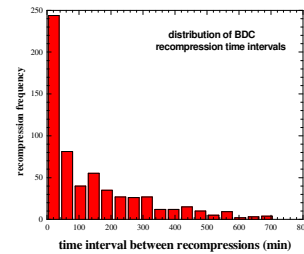
Implement a device (Big Droplet Chamber) capable of increased active mass in significantly smaller volumes. Effectively a bubble chamber, it consists of a gel-lined sheathing of the containment vessel. The device is recompressed using a pressure-activated piston system. The BDC's are instrumented with both a standard (MCE-200) and ultrasonic (CM16/CMPA40-5V) microphone and pressure transducers.



a prototype 0.15 kg BDC in operation (April, 2010).



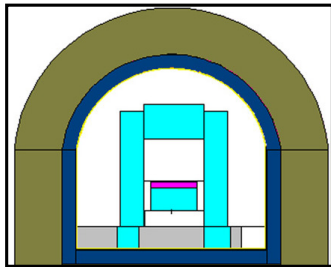
Schematic of the BDC acquisition, control and operating diagram.



time intervals between prototype BDC re-compressions

SCHEMA

The BDCs are to be centrally installed inside a small volume waterpool at a bath temperature of 9.0°C at the 1500 mwe level of the LSBB, and pressurized to 2 bar to reduce background sensitivity

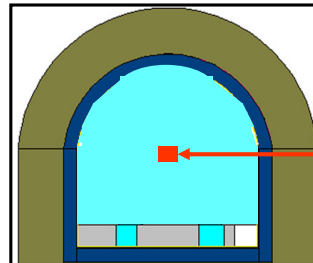


Phase II

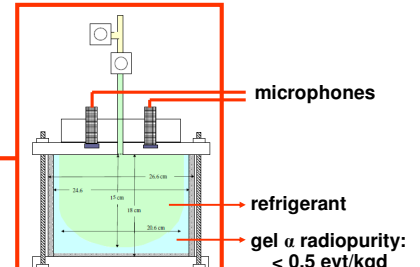
INCREASE water thickness by 2 x...



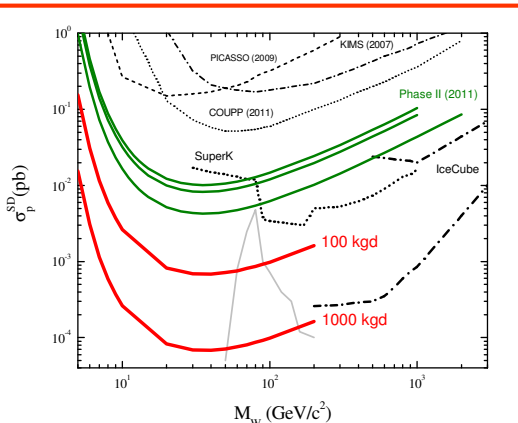
DECREASE water U/Th by 2×10^4 (current shield water mainly from corroded underground storage tanks – no purity attempts)



Phase III



Schema: 5 kg C_3F_8 BDC

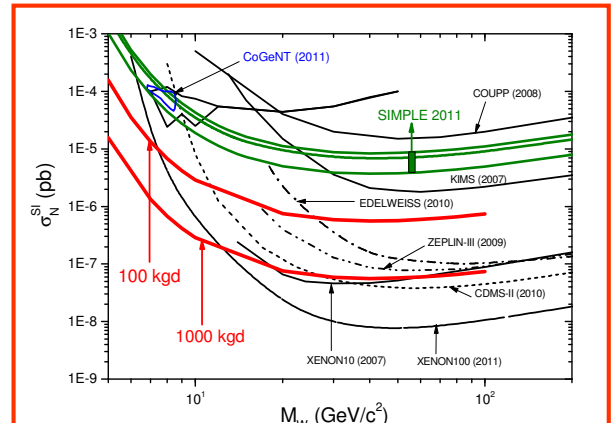


Spin-dependent WIMP-proton scattering.

ANTICIPATED RESULTS (after 10 day runs)

Stage 1: 2x 5 liter BDC

Stage 2: 5x 20 liter BDC



Spin-independent WIMP-nucleus scattering.