

Abstract Submitted
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A Bubble Chamber for Dark Matter Detection: The COUPP Project BRIAN ODOM, University of Chicago, COUPP COLLABORATION — Heavy-liquid bubble chambers can be made stable-enough to be used in WIMP searches. Advantages of this approach are an optimal choice of target (CF₃I, maximally sensitive to both spin-dependent and -independent WIMP interactions), low cost, good scalability, room temperature operation, extraordinary intrinsic rejection of minimum-ionizing backgrounds (rejection $> 10^9$, as opposed to $\sim 10^4$ in cryogenic devices), and a number of features permitting rejection of irreducible neutron backgrounds. Scalability to a ton-level mass also appears quite promising. A 2 kg prototype chamber has been constructed and is currently operating at a depth of 300 m.w.e. (meters water equivalent) in the NuMi gallery of Fermilab. The currently observed event rate, believed to be from alpha backgrounds, is expected to yield the best limits on WIMP-proton spin-dependent coupling. A 20 kg modular chamber, expected to have substantially reduced alpha backgrounds, is currently under construction and is expected to yield extremely competitive spin-independent coupling results.

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