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Superheated Droplet Geyser Based on Water

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Weakly interacting massive particles (WIMPS), the leading candidate for dark matter, interacts differently than what we would expect with ordinary baryonic matter. These interactions require very sensitive detectors. Being much cheaper than xenon, when superheated, ultra-purified water can act as a sensor to detect these rare events. Alongside replicating other WIMP detectors the bubble chamber can also be used to validate through detection of neutrons, which should elastically scatter through the same mechanism as dark matter. The design of this sensor consists of four essential parts: an temp-adjustable hotplate, a thermal bath, a test tube that holds both the metastable liquid and oil that acts as a surface tension buffer, and a recondenser that is attached to the test tube. We've reached the rate of one major event per minute. The approximate average cosmic-ray background, dominated by GeV-scale muons near sea level, and partially verified that a statistically significant increase in rate occurs in the presence of neutron sources like AmBe or Cf-252, but not in gammas.

Primary author: ELLIS, Anthony (SUNY Albany)

Presenter: ELLIS, Anthony (SUNY Albany)