# Warsaw Workshop on Non-Standard Dark Matter: <br/> multicomponent scenarios and beyond

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## A Superheated, Scintillating, Liquid Xenon Bubble Chamber for Expanding the Direct Search for Dark Matter

**Content** :

The search for dark matter, which comprises ~25\% of the energy content of the universe, is today one of the most exciting fields in particle physics. As bigger detectors are being built to increase their sensitivity, background reduction is an ever more challenging issue. To this end, a new type of dark matter detector is being developed, a xenon bubble chamber, which would combine the strengths of liquid xenon TPCs, namely event by event energy reconstruction, with those of a bubble chamber, namely insensitivity to most electronic recoils. In addition, it would be the first time ever that a dark matter detector is active on all three detection channels, ionization and scintillation characteristic of xenon detectors, and heat through bubble formation in superheated fluids. Preliminary simulations have shown that, depending on the threshold, a discrimination of 99.99\% to 99.9999+\% can be achieved, which is on par or better than many current experiments. Such a detector, being both gaseous and liquid, could potentially punch through the neutrino floor using directionality, as well as be sensitive to ultra-relativistic light WIMPs through high-energy electron recoils observed as visible, directed bubble tracks, plus achieve ultra-low-, sub-keV thresholds, in order to look for low-mass WIMPs via low-energy nuclear recoils.

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