

Abstract Submitted
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Improved Experimental Setup for the Read Out of Superheated Emulsion Bubble Detectors¹ ESHA RAO, Rutgers University, New Brunswick, MICHAEL HEPLER, Princeton University, ROB GOLDSTON, Princeton Plasma Physics Laboratory — An improved experimental setup with 3D localization of bubbles has been designed and is under construction for the quick and accurate read out of superheated emulsion bubble detectors. Since 1979, bubble detectors have found use in dosimetry, radiation alarms, and potentially nuclear warhead verification. Droplets suspended in a gel matrix undergo a phase transition when struck by high-energy neutrons in the detectors and are easily counted using optical methods. However, at high fluence the accuracy of counts is reduced due to occultation. Currently, our group uses images of a rotating detector to localize and count bubbles far past the occultation limit. To improve the precision of localization and to reduce the time needed to read detector output, upgrades have been made to the control algorithm and setup of the bubble counter. Instead of capturing single-frame images, high-resolution videos of the rotating detectors are taken using a DSLR camera controlled by a Raspberry Pi. This new experimental setup has a more precise placement of its components, lighting, and rotation allowing for better reproducibility of experimental results. Additionally, the new setup provides a more user-friendly control interface and is contained in a compact enclosure.

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