

## **Matthew Szydagis**

### Using Supercooled Water to Detect Radiation

The cloud and bubble chambers have historically been used for particle detection, capitalizing on supersaturation and superheating respectively. We present now on the snowball chamber, which utilizes supercooled water. In our prototype, an incoming particle triggered crystallization of purified water. We demonstrate that water is supercooled for a significantly shorter time with respect to control data in the presence of AmBe and Cf-252 neutron sources. A greater number of multiple nucleation sites is observed as well in neutron calibration data. We have resurrected a technology abandoned in the 1970s and shown that supercooled water responds not only to betas and gammas as previously demonstrated, but under the right conditions responds to neutrons, almost exclusively. We will discuss the physics and chemistry behind this process, and its potential practical applications in the detection of particles and radiation.