Observation of New Type of Negative Ion in Superfluid Helium

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In recent work we have developed a new technique for the study of the properties of electron bubbles (negative ions) in liquid helium. We use ultrasound to measure the critical negative pressure $P_c$ at which an electron bubble becomes unstable and explodes. The value of $P_c$ is affected, for example, by the quantum state of the electron and by whether the bubble is in bulk liquid or is attached to a vortex. In the present experiments we have discovered a new type of object that appears to be larger than the usual electron bubble. We will consider possible explanations of these observations.

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