

Optical Properties of Electron Bubbles in the 1P State

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When an electron is injected into liquid helium, it forces open a cavity that is free of helium atoms (an electron bubble). If the electron is in the ground 1S state, this bubble is spherical. By optical pumping it is possible to excite a significant fraction of the electron bubbles to the 1P state; the bubble then loses spherical symmetry. We present calculations of the energies of photons that are needed to excite these 1P bubbles to higher energy states (1D and 2S) and the matrix elements for these transitions. Measurement of these transition energies provides detailed information about the shape of the 1P bubbles.