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Vortices in superconducting nanoshells. JACQUES TEMPERE, VLADIMIR GLADILIN, Universiteit Antwerpen, ISAAC SILVERA, Harvard University, JOZEF DEVREESE, Universiteit Antwerpen — A nanoshell consists of a nanoscopic grain of insulator (typically $Si0_2$) on which a thin layer of metal is deposited. If the material used to make the thin shell is superconducting, the nanoshell itself will exhibit superconducting order. When the superconducting nanoshell is placed in a magnetic field, vortices can be nucleated near the equator of the spherical shell, and will move towards the poles of the nanoshell where they are trapped. Using the Ginzburg-Landau equations adapted for the spherical geometry, we investigate the possibility for giant vorticity and multi-vortex states on thin spherical shells, as a function of shell radius and magnetic field. Furthermore we show that this nanostructure shows potential for flux trapping, as it has a strong magnetization hysteresis.

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