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Vortex states in nanosuperconductor LIVIU CHIBOTARU, BART DELOOF, University of Leuven, Department of Chemistry, VICTOR MOSHCHALKOV, University of Leuven, Department of Physics, DEPARTMENT OF PHYSICS TEAM — The vortex states in nanoscale superconductors are investigated within generalized Bogolubov-de Gennes theory. For symmetric (square-shaped) samples thermodynamically stable vortex phases form symmetry-consistent patterns and no transition to conventional Abrikosov-like vortex patterns occurs till $T = 0\text{K}$ for sizes not exceeding 25 nm. For vorticity $L = 2$ a giant vortex is stabilized at temperatures in the vicinity of T_c , which transforms into a giant antivortex $L = -2$ and four normal vortices with lowering the temperature. On the other hand, the vortex pattern for vorticity $L = 3$ corresponds to an antivortex $L = -1$ and four normal vortices in the whole temperature domain.

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