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Microscopic description of vortices in nanoscale superconductors LIVIU CHIBOTARU, BART DELOOF, VICTOR MOSHCHALKOV, University of Leuven — The results of Bogolyubov-de-Gennes calculations for thin superconducting discs and squares in applied magnetic field will be presented. The paramagnetic effect is taken fully into account. The vortex phase diagrams for the samples of nanoscopic size will be constructed and compared with the predictions of the Ginzburg-Landau theory. The size limitations for the entering of one and several vortices as function of material parameters will be established. Several unusual vortex transformations during the vortex pattern evolutions as function of temperature and field will be discussed.

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