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Influence of the interplay between de Gennes boundary conditions and cubicity of Ginzburg-Landau equation on the properties of superconductors[1] OLEG OLENDSKI, King Abdullah Institute for Nanotechnology, King Saud University — Solutions of the Ginzburg-Landau (GL) equation for the film subjected to the de Gennes boundary conditions (BCs) with extrapolation length Λ are analyzed with emphasis on the interaction between Λ and the coefficient β of the cubic GL term and its influence on the temperature T of the strip. Very substantial role is played also by the carrier density n_s. Physical interpretation is based on the n_s-dependent effective potential $V_{eff}(\mathbf{r})$ created by the nonlinear term and its influence on the lowest eigenvalue of the corresponding Schrödinger equation. For the large cubicities, the temperature T becomes Λ independent linearly decreasing function of the growing β since in this limit the BCs can not alter very strong V_{eff}. The temperature increase produced in the linear GL regime by the negative de Gennes distance is wiped out by the growing cubicity. In this case, the decreasing T passes through its bulk value T_c at the unique density $n_s^{(0)}$ only, and the corresponding $\Lambda_{T=T_c}$ is an analytical function of β. For the large cubicities, the concentration $n_s^{(0)}$ transforms into the density of the bulk sample. Other analytical asymptotics are analyzed too.

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Oleg Olendski
King Abdullah Institute for Nanotechnology, King Saud University

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