
Material equation for a granular superconductor

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The magnetic field penetration to the high-temperature superconductors (HTSC) massive samples is investigated traditionally from the position of electrodynamics of the second type superconductors, although HTSC is a plural Josephson medium. By averaging the microscopic parameters of Josephson medium the material equation of such a medium it is shown that the general view of the proposed material equation does not practically depend on the distribution of the superconducting granules in size. On the basis of the received material equation magnetic field penetration into Josephson medium is investigated. Vortical solutions of the obtained equation are also modeled and the conclusion is formulated that the magnetic vortices in the HTSC should be containing the single magnetic flux quantum.

Keywords: *Josephson medium, the material equation, magnetic vortices, phenomenological parameters.*

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