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A model study of superconducting transition by electrostatic tuning DONGHOON KIM, J.D. LEE, Daegu Gyeongbuk Institute of Science and Technology — New superconducting transition depending on the number of layers under the electrostatic tuning in FeSe film has been reported. In the report, the superconducting transition which strongly depends on the number of layers in FeSe film was shown to be closely related to an interaction between superconducting layers. Here we propose a model Hamiltonian of the Josephson junction consisting of several superconducting layers, where each superconducting layer is described by the Richardson Hamiltonian, corresponding to the exact solution of BCS theory, and furthermore an interaction between superconducting layers is taken into account. In the model, we investigate the supercurrent flow in the Josephson junction and find that the supercurrent does not flow from the bottom to top layer without the electrostatic tuning. This implies that an interaction between superconducting layers plays a role in the superconducting transition.

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