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Properties of the N layer inside of a SINIS sandwich-type Josephson junction[1] IVAN NEVIRKOVETS, OLEKSANDR CHERNYASHEVSKYY, Northwestern University, Department of Physics and Astronomy, Evanston IL 60208, JOHN KETTERSON, Northwestern University, Department of Physics and Astronomy, Department of Electrical Engineering, and Materials Research Center, Evanston IL 60208 — We report characteristics of a multi-terminal SINIS device which has electrical leads connected to the middle N layer; here S, I, and N denote a superconductor (Nb), an insulator (AlO_x), and a normal metal (Al) respectively. Specifically, we studied properties of the middle (10-20 nm thick) N layer in dependence of Josephson current passing through all layers and on an injection current passing through one of the individual (NIS) junctions. The unperturbed I-V curve of the N film displays a small phase-coherent current near zero voltage, which can be suppressed by a very weak magnetic field (applied in parallel to the layers). In the last case, the state of the N film may be regarded as normal; at the same time, a sufficiently high supercurrent can flow between the S electrodes. An injection current (lower than the Josephson current) from one junction induces additional phase-coherent contribution to the I-V curve. We consider possible explanation of the observed behavior.

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