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**Magnetic-field-driven phase transitions in Josephson arrays** JOSHUA PARAMANANDAM, MATTHEW BELL, ALEKSANDR VEREVKIN, LEV IOFFE, MICHAEL GERSHENSON, Rutgers University — We have studied the phase transitions induced by the magnetic field $B$ in arrays of small Josephson junctions. The number of nearest-neighbor junctions connected to a single superconducting island varied between 4 and 11 for different arrays. When frustrated by the magnetic field, the arrays demonstrated several quantum phase transitions at different critical values of the resistance between $R$=3-10 k, which is in line with earlier observations. In particular, with increasing $B$ we observed transitions between three states: a) the superconducting state with zero $R$, b) the "metallic" state with a weak $R$ dependence on T in the range 40mK<T<200mK, and c) the "insulating" state with an activation dependent $R(T)$. The activation energy, extracted from the current-voltage characteristics and the Arrhenius fitting of $R(T)$ in the "insulating" regime, has been studied in detail as a function of the temperature and the magnetic field. The data indicate the possible development of a strongly inhomogeneous state when approaching the superconducting-to-insulating transition.

Joshua Paramanandam
Rutgers University

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