Abstract Submitted
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Finite size scaling analysis of the helicity modulus and the inverse dielectric constant in two capacitvely coupled Ultrasmall 2D Josephson Junction Arrays[1] GUILLERMO RAMIREZ-SANTIAGO, Instituto de Fisica, UNAM (MEXICO), JORGE JOSE, Dept. of Physics, University at Buffalo, State University of New York — We have carried out a finite size scaling analysis of the helicity modulus Υ_i and the inverse dielectric constant ϵ_i, $(i = 1, 2)$ of two capacitively coupled Josephson junction arrays with charging energy, E_c, and Josephson coupling energy, E_J. The arrays are coupled via the capacitance, $C_{\rm inter}$, at each site of the lattices. The parameter that measures the importance of quantum fluctuations in the i-th array is, $\alpha_i \equiv \frac{E_{c_i}}{E_{J_i}}$. We have considered the interplay between vortex and charge dominated individual array phases by means of extensive path integral Monte Carlo simulations. It has been found that this system develops a *reentrant transition* in $\Upsilon(T, \alpha)$, at low temperatures, when one of the arrays is in the semiclassical limit (i.e. $\alpha_1 = 0.5$) and the quantum array has $2.0 \leq \alpha_2 \leq 2.5$, for $C_{\rm inter} = 0.26087, 0.52174, 0.78261, 1.04348$ and 1.30435. Similar behavior was obtained for larger values of $\alpha_2 = 4.0$ with $C_{\rm inter} = 1.04348$ and 1.30435.

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Enrique Diaz-Herrera
Depto. de Fisica, UAM-I (MEXICO)

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