Abstract Submitted for the MAR17 Meeting of The American Physical Society

Amplification of the diamagnetic response in small Hubbard rings

AMIR CALDEIRA, THAIS TREVISAN, Instituto de Fsica Gleb Wataghin - Universidade Estadual de Campinas - UNICAMP — We present a brief resume of a study of the electric transport properties of small discrete rings with $3 \leq N \leq 6$ sites and $N_e < 2N$ electrons, which can be seen as a simplified version of real aromatic molecules. In particular, the ring with six sites and six electrons is our prototype of the benzene molecule. It is already known that the Hubbard model itself cannot account for the anisotropy of the diamagnetic susceptibility of the aromatic molecules, which is observed when they are subjected to an external magnetic field perpendicular to their basal plane. Therefore, we propose an extension of the Hubbard model, with an ad hoc extra interaction term, with two adjustable parameters. Our results show that this extension of the Hubbard model is able to amplify the persistent currents established in the ground state of our rings and, moreover, promotes an enhancement of the magnetic susceptibility anisotropy depending on the tuning of the adjustable parameters.

Amir Caldeira Universidade Estadual de Campinas - UNICAMP

Date submitted: 20 Nov 2016 Electronic form version 1.4