Diamagnetism of quasi-2D charged Bose gases under confinements

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Recently, the normal state diamagnetism of high T_c superconductors is explained using the normal state Landau diamagnetism of charged bosons based on the preformed real-space pairs scenario.[1] This stimulates renewed research interest in the properties of charged Bose gases. It is already indicated that the homogeneous gas does not undergo Bose-Einstein condensation (BEC) in a constant magnetic field.[2] We consider a quasi-2D charged Bose gas with some confinement imposed in the xy plane. We show that BEC takes place in this case and the system exhibits exotic magnetic properties different from those of homogenous gases.

[1] A.S. Alexandrov, Phys. Rev. Lett. **96**, 147003 (2006); J. Phys.: Condens. Matter **22**, 426004 (2010).
[2] M.R. Schafroth, Phys. Rev. **100**, 463 (1955); J.M. Blatt and S.T. Butler, Phys. Rev. **100**, 476 (1955).