Strongly Coupled Field Theories and Magnetic Fields in Holography

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Abstract: We discuss the holographic approach to electromagnetic phenomena in large N strongly coupled field theories. We begin by providing new solutions in supergravity that correspond to quantum field theories with a theta term and in presence of magnetic fields. In particular we find vacuum and excited solutions with the latter being anisotropic charged black holes. Once we obtain the solutions we study their stability and their properties. Then we explore the influence of magnetic fields on the phase diagram of the strongly coupled field theory and discuss the effects of magnetic fields on transport coefficients, like the shear viscosity, and on the heavy quark observables, like the baryons and mesons.