A New Mechanism for Nuclear Magnetic Relaxation in *d*-wave Superconductors in High Magnetic Fields

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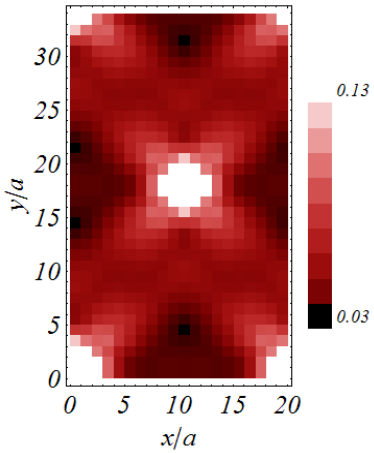
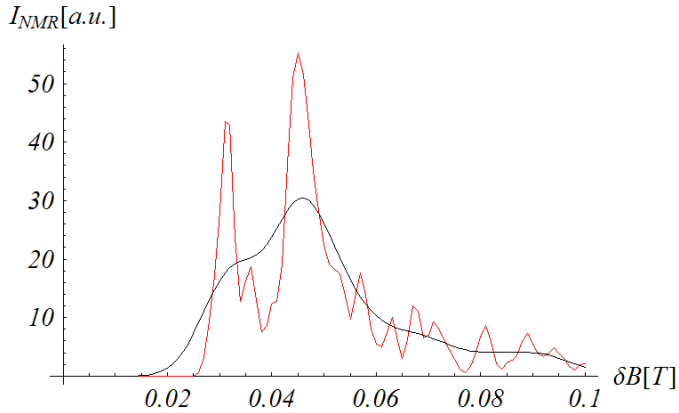
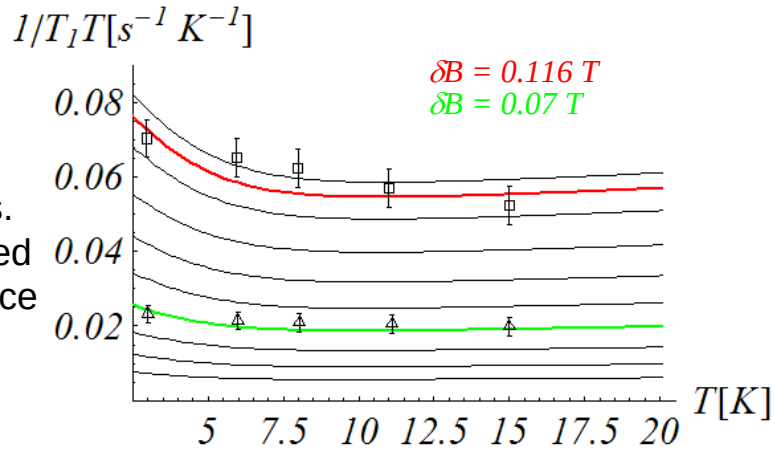


One of the long standing puzzles in the field of **high temperature superconductors** is the ^{17}O NMR data which reveal that in high magnetic fields $1/T_1T$ exhibits an upturn as the temperature T is lowered. (T_1 is the spin-lattice relaxation rate.) Additionally, there is a broadening of the NMR line shape.



We present a microscopic theory which is in quantitative agreement with this data. The key finding is a new relaxation process, which is argued to dominate at low T, in which the nucleus relaxes by creating or annihilating two quasiparticles. In addition the broadening of the line shape may be accounted for by the fact that the Knight shift, or the shift in the resonance frequency of the nuclei due to the presence of electrons, is strongly position-dependent.



Robert E. Throckmorton and Oskar Vafek, “Theory of site-selective NMR in d-wave superconductors”, arXiv:0908.4268 (2009)