

A second highlight in the thesis is the infrared evidence for precursor phenomena of superconductivity in the YBCO family at temperatures as high as 180 K, about twice T_c . In this paper, conventional infrared spectroscopy is applied to the study of the interlayer effects along the c axis of the cuprate structure, in particular the Transverse Plasma Resonance and novel anomalies in the c-axis phonon modes. By studying a number of crystals which differ for their oxygen content, Dubroka et al. could trace a new line on the temperature-doping phase diagram of the high- T_c cuprates, situated between the superconducting transition and the pseudogap line.

The third paper I want to mention is that on the femtosecond response of quasiparticles and phonons in superconducting YBCO. This pump-probe experiment – where the probe is in the THz domain – provides a direct observation of the interaction between the carriers and the apical oxygen vibration of YBCO, thus giving strong support to the role of the electron-phonon interaction in the formation of Cooper pairs in high- T_c superconductors.

All these works, as well the others reported in the thesis and the thesis itself, are accompanied by an exhaustive and updated bibliography.

In summary, by reading the thesis and the curriculum vitae of Dr. Dubroka, I have been greatly impressed by the work done in the last years. It is all of high scientific quality, well supported by a deep knowledge of the technique, the theory and the literature, and always aimed at facing the most recent and intriguing problems in the field. On this basis, I strongly support the application of Dr. Adam Dubroka for a Habilitation in experimental physics.

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