

博士論文公聴会の公示(物理学専攻)

学位申請者 : VINCINI, Giulio

論文題目 : **Study of Multilayered Cuprate Superconductors by Electronic Raman Scattering** (電子ラマン散乱による多層系銅酸化物超伝導体の研究)

日時 : 2018年 8月 6日 (月) 16:00-17:30

場所 : 理学研究科H棟 7階セミナー室 (H701号室)

主査 : 田島 節子

副査 : 黒木 和彦、松野 丈夫、宮坂 茂樹、田中 清尚(分子科学研究所)

論文要旨:

It is well established that high T_c cuprate superconductors share the common electronic phase diagram irrespective of crystal structures. It is also known that, in the case of multilayer cuprates containing more than three CuO_2 -layers in a unit cell, the doping level of each layer is different with each other. The electronic properties of such a complicated system is not obvious. With an interest in the interlayer interaction and its relation to the high superconducting transition temperature T_c , electronic Raman scattering spectra have been studied.

The precise T - and doping dependence of Raman scattering spectra were measured for $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_z$ single crystals. In the B_{1g} polarized spectrum two pair-breaking peaks were first observed, while only a broad single peak in the B_{2g} polarization. From the quantitative comparison with the angle-resolved photoemission data, the high and the low ω B_{1g} -peak was ascribed to the pair-breaking peak for the inner and outer CuO_2 -plane, respectively. Surprisingly, all the B_{1g} peak energies for inner and outer planes of four crystals can be plotted on a single linear line as a function of doping.

Another important finding is that the ratio $2\Delta/k_B T_c$ is much larger than that for single- and double layer cuprates. It means that the T_c is suppressed in the triple layer cuprates presumably because of the interaction between different doping layers with different original T_c values.