

Grain Boundaries in the Cuprate Superconductors: Tapes and Tunneling Spectroscopy

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Abstract - Grain boundaries in the high temperature superconducting cuprates have played a central role in their development for practical applications and fundamental understanding of the nature of superconductivity in these materials. Tapes for energy use, SQUIDS, symmetry of the wave function, Qbits, applications related to the AC Josephson effect, and tunneling spectroscopy are some areas of current research. In this brief note, the authors summarize what we know about what limits the critical current densities of tapes and suggest a few experiments to further understand these limits to critical current densities and, secondly, the use of grain boundary to do tunneling spectroscopy in optimally doped $\text{La}_{1.84}\text{Sr}_{0.16}\text{CuO}_4$ (LSCO). This includes new data and comparisons with theory and experiments. The background material and review was presented at the EUCAS 09 in Dresden, as one of the plenary talks and is available from the authors.

Keywords (Index Terms)- Superconducting tapes, Cuprate superconductors, High Tc films, Tunneling phenomena

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