

Dimensional crossover in the pinning of heavy-ion irradiated Bi-2212 films

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DC sputtered and Au irradiated Bi-2212 films have been investigated by UHV-STM measurements to study the possible effect of the irradiation on the local oxygen stoichiometry. In the irradiated films, the observed well known modulation of the BiO planes extends up to the columnar defects and an influence on the oxygen concentration is not detected. Pinning and irreversibility behavior of the Bi-2212 films have been examined by means of SQUID magnetometry. A dimensional crossover in the flux-line lattice was found as a transition between different scaling laws for the irreversibility line. A correlation was found between the efficiency of the columnar defects and the dimensionality of the flux-line lattice.