Influence of columnar defects on vortex dynamics in $Bi_2Sr_2CaCu_2O_8$ from out-of-plane and flux transformer transport measurements

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The c-axis resistivity, $\rho_c(B,T,\theta)$, where θ is the angle between the c axis and the dc field, has been measured for $Bi_2Sr_2CaCu_2O_8$ single crystals before and after the introduction of columnar defects by heavy ion irradiation. The effects of different columnar track density and angle with respect to the basal plane are also investigated. Uniaxial enhancement of the irreversibility line for fields below the matching field and parallel to the columnar defects is observed in out-of-plane transport measurements. Measurements in the flux transformer geometry confirm that the vortices are connected lines in the irradiated crystal. We have also attempted to reconcile *c*-axis data with the predictions of the Bose-glass theory for correlated disorder.