

Observations of suppression of static and dynamic disorder in $\text{Bi}_{2.15}\text{Sr}_{1.85}\text{CaCu}_2\text{O}_{8+\delta}$ crystals by columnar defects

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Muon spin rotation and small angle neutron scattering measurements have been carried out on $\text{Bi}_{2.15}\text{Sr}_{1.85}\text{CaCu}_2\text{O}_{8+\delta}$ single crystals irradiated with fast heavy ions. The data give substantial evidence that even below the matching field, the positions of the vortices, in a plane perpendicular to the tracks, are not random. Furthermore, the crossover to a glassy vortex arrangement, observed in the pristine material, is moved to higher fields. It is shown that the presence of the columnar defects also strongly suppresses the thermal fluctuations of the vortices in comparison with the pristine material.