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Mechanisms of Vortex Pinning by Graded Triangular Arrays of Submicrometric Defects in a Superconducting Nb Film

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Abstract

We have investigated the periodic pinning of magnetic flux quanta in the Nb films with graded triangular arrays of submicrometer defects. Arrays of pinning centers with a spacing of about 425nm to 375 nm and a diameter of about 250nm were fabricated by the electron beam lithography. In the mixed states, the minima of magnetoresistance and maxima of critical current as a function of magnetic field appear at certain values of magnetic field corresponding to the flux quanta calculation of the lattice spacing of the homogenous ones (400nm). A comparison of will be discussed graded and homogenous triangular arrays.