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Interplay between vortex matter phases and arrays of pinning centers in low temperature superconductors[1] JOSE L. VICENT, JAVIER DEL VALLE, ALICIA GOMEZ, Universidad Complutense Madrid, MANUEL RODRIGUEZ, DANIEL GRANADOS, IMDEA-Nanociencia, Madrid, FERNANDO GALVEZ, ELVIRA M. GONZALEZ, Universidad Complutense Madrid — We have studied vortex matter phases in Nb films grown on Si substrates with arrays of Cu nanodots. The symmetry of the pinning arrays rules the presence of vortex matter phases. Four-fold symmetry arrays enhance the vortex glass transition temperature, at matching fields, in comparison with plain Nb films. This is a similar effect that obtained using arrays of magnetic pinning centers (Villegas et al. PRB72, 174512). Breaking the symmetry of the pinning array, such that the array mimic a smectic crystal, leads to a new phase, in a very narrow temperature window between the liquid and glassy phases, which can be identified with a vortex smectic phase. Remarkably, the smectic vortex phase is enhanced increasing the array symmetry. Increasing the number of vortices vanishes this smectic phase. (H,T) phase diagrams will be presented for different types of arrays.

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