Observation of a hexatic fluid in the vortex state of thin *a*-MoGe films

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The hexatic state refers to state in between a solid and a liquid which has short range positional order but quasi-long range orientational order. In the celebrated theory of Berezinskii, Kosterlitz and Thousless and subsequently refined by Halperin, Nelson and Young (BKTHNY), it was predicted that a 2-dimensional hexagonal solid can melt in two steps: First, through a transformation from a solid to a hexatic fluid which can flow along preferential orientations and then from a hexatic fluid to a regular isotropic fluid. In this talk, using a combination of low frequency electrodynamic measurements and scanning tunnelling spectroscopy imaging, I will show that a hexatic fluid state is realised in the 2-dimensional vortex state of *a*-MoGe thin films. I will show that in the hexatic state, the vortex lattice is free to flow along certain preferential directions of the vortex lattice giving rise to dissipation even at very small currents.