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Using large scale 2D modeling to explain driven vortex motion observed by STM MICHAEL DREYER, JONGHEE LEE, HUI WANG, University of Maryland, BARRY BARKER, LPS — We studied vortex matter in $NbSe_2$, a type II superconductor, at magnetic fields of 0.25 - 0.75 T and temperatures of 4.2 K. At these fields the vortices form an Abrikosov lattice. Due to a small residual resistance in our superconducting magnet the applied magnetic field slowly decayed, driving the vortex lattice. The velocity was low enough to allow acquiring highly resolved time series using a low temperature scanning tunneling microscopy (STM). From the images we where able to extract the lattice constant as well as time series of the average vortex position (path) and velocity. The data was compared to a large scale 2D molecular dynamic type model of over 10000 vortices. Different configurations were examined to match the observed behaviour concerning vortex tracks, velociy vs. time and lattice constant vs. time. The data is detailed enough two distinguish small loops in the vortex tracks most likely caused by lattice dislocations. The focus of this presentation lies in matching simulation to the observed time evolution of the average velocity and lattice constant. We would like to thank Eva Andrej and Helmut Berger for providing $NbSe_2$ samples.

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