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Comparing computer simulations to measurements of slow moving vortices in $NbSe_2$ MICHAEL DREYER, JONGHEE LEE, HUI WANG, University of Maryland, BARRY BARKER, Lab. for Phys. Sci. — We observed slow moving vortices in $NbSe_2$ using scanning tunneling microscopy (STM) at a temperature of 4.2 K driven by the slow decay of the magnetic field of our superconducting magnet. The velocity of the vortices depends on the rate of field decay ($\tilde{0}$.4 mT/day) and the distance of the STM tip from the center of the sample. In our case the velocities of the vortices are in the range of $\tilde{p}$m/s allowing for high spatially and (relatively speaking) temporal data series. In order to understand the details of the measurements we wrote a simple 2D simulation for moving vortices in a static potential landscape. The simulation allows for a variety of scenarios such as periodic/fixed boundaries, constant/variable driving force, insertion/extraction of vortices, point/line defects in order to match the behavior in the simulation to the measurement. Although some phenomenas such as similar track patterns and local lattice distortions around point defects have been reproduced, the behavior of the velocity with time, showing aperiodic 'spikes', so far defied explanation. The results of the simulation as well as possible reasons for the velocity vs. time data will be discussed in detail.

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