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Shielded Superconducting Linear Motor for Towed-Grid Studies of Quantum Turbulence SHU-CHEN LIU, YIHUI ZHOU, GARY G. IHAS, University of Florida, DR DEMETRIS CHARALAMBOUS, ET AL. COLLABORATION[1] — The purpose of the ongoing low temperature quantum turbulence research is to compare experimental data with existing theoretical results. Both should be carefully produced under the same conditions, i.e., isotropic homogeneous turbulence. In our planned experiment, this requirement would be met by towing a grid through a channel of superfluid helium at 20 mK. A grid motion of 1 cm at a nearly constant speed of 1 m/s is required. To avoid heating due to the motive force driving the grid, a magnetically shielded superconducting linear motor is proposed. The grid is attached to the end of a light insulating rod which has two niobium cylinders fastened to it and about 15 mm apart. This part of the rod is inside a superconducting solenoid which, when driven with the properly shaped pulse current, accelerates the rod (and grid) over 1 mm, moves the rod and grid at constant speed for 10 mm, and then decelerates it over 1 mm. Simulation results demonstrate that the voltages and currents required are quite reasonable. The simulation and control program is written in LabView with embedded C compiler. Using the simulator, various designs of solenoid, with and without shielding, may be easily investigated. The most promising designs along with the experimental testing results will be presented.

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