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Velocity dependence of supersolid He-4 in a torsion oscillator. ETHAN PRATT, BENJAMIN HUNT, VIKRAM GADAGKAR, Cornell University, MINORU YAMASHITA, Kyoto University, J.C. SEAMUS DAVIS, Cornell University, Brookhaven National Laboratory, University of St. Andrews — We have developed a free-inertial-decay mapping technique which allows us to acquire the complete velocity-temperature phase diagram of supersolid He-4. A striking new feature of the resulting supersolid response map is the appearance of an enhanced dissipation superpeak. We discuss these results in context of various microscopic mechanisms for the velocity-induced suppression of the supersolid response, including a superfluid critical velocity, defect network critical shear, and a glassy dynamical susceptibility.

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