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Second sound in supersolid ^4He NORBERT MULDER, Department of Physics, University of Delaware, SANGIL KWON, EUNGSEONG KIM, Center for Supersolid Quantum Matter Research and Department of Physics, KAIST, Korea — In a system that consists of two interpenetrating continuous phases that are free to move with respect to each other, one would expect to find two longitudinal sound modes. A good example is fourth sound in superfluid helium in a porous matrix, but the phenomena can also be observed with water in rocks. If one interprets the observation of a non-zero NCRIF in solid helium below ~ 100 mK as due to the independent motion of a supersolid fraction with respect to the crystal, it follows that two longitudinal sound modes should exist, with the slow mode disappearing at the supersolid transition. We will report on our efforts to find this slow mode.

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