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Decay of superfluid currents in moving boson lattice systems ANATOLI POLKOVNIKOV, EHUD ALTMAN, EUGENE DEMLER, BERTRAND HALPERIN, MIKHAIL LUKIN, Department of Physics, Harvard University — Following up on the previous talk, we analyze the broadening of the dynamic superfluid-insulator transition due to quantum and thermal fluctuations. We derive asymptotic expressions for the decay rate of superfluid currents near the transition. We show that in three dimensional optical lattices the broadening of the transition is very weak. On the other hand in two and especially in one dimension the broadening is very significant unless the system is very deep in the superfluid regime. We argue that at experimentally relevant temperatures the quantum decay is stronger than the thermal and thus is straightforward to observe.

Mikhail Lukin
Department of Physics, Harvard University

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