Self-Stabilizing Measurement of Phase[1] SAI VINJANAMPATHY, CQT, National University of Singapore — Measuring phase accurately constitutes one of the most important task in precision measurement science. Such measurements can be deployed to measure everything from fundamental constants to measuring detuning and tunneling rates of atoms more precisely. Quantum mechanics enhances the ultimate bounds on the precision of such measurements possible, and exploit coherence and entanglement to reduce the phase uncertainty. In this work, we will describe a method to stabilize a decohering two-level atom and use the stabilizing measurements to learn the unknown phase acquired by the atom. Such measurements will employ a Bayesian learner to do active feedback control on the atom. We will discuss some ultimate bounds employed in precision metrology and an experimental proposal for the implementation of this scheme.

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