Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

**Tunneling Times and Studying the Effects of Dissipation** DAVID SPIERINGS, RAMON RAMOS, ISABELLE RACICOT, BRYCE WU, AEPHRAIM STEINBERG, University of Toronto — How much time does a tunneling particle spend in the barrier region? An answer to this question may be defined by considering a "weak measurement" in the sense of Aharonov, Albert, and Vaidman. A Larmor clock, which uses a spin degree of freedom to keep time, can implement such a measurement experimentally [1]. Here, we report the status of our experiment on measuring times for Bose-condensed Rubidium atoms tunneling through a 1-micron optical barrier [2]. We also consider probing the quantum/classical transition by studying what happens when the Larmor measurement is made "strong" and/or under the influence of engineered dissipation [3]. [1] Steinberg, A. M. (1998). Time and history in quantum tunneling. *Superlattices and Microstructures*, *23*(3–4), 823–832. http://doi.org/10.1006/spmi.1997.0543 [2] Potnis, S., Ramos, R., Maeda, K., Carr, L. D., & Steinberg, A. M. (2017). Interaction-Assisted Quantum Tunneling of a Bose-Einstein Condensate out of a Single Trapping Well. *Physical Review Letters*, *118*(6), 1–5. http://doi.org/10.1103/PhysRevLett.118.060402 [3] Steinberg, A. M. (1999). On energy transfer by detection of a tunneling atom. Korean Physical Society 35 (3), 122. (http://arxiv.org/abs/quant-ph/9904098)

David Spierings
University of Toronto

Date submitted: 26 Jan 2018 Electronic form version 1.4