

Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Modeling matter-wave emission into a structured vacuum¹

MICHAEL STEWART, JOONHYUK KWON, DOMINIK SCHNEBLE, Stony Brook University — The implementation of matter-wave based open quantum systems [1] provides access to novel emission behaviors beyond the usual Markovian treatment. In this talk we theoretically analyze the effects of introducing an emission vacuum with a band structure mirroring that of a photonic crystal. We calculate the exotic decay dynamics arising from the analytic structure of the systems self energy. We find the existence of two poles outside the band corresponding to bound states above and below the band, and investigate their dynamical signatures in the time evolution of the emitted matter-wave population.

[1] L. Krinner, M. Stewart, A. Pazmio, J. Kwon, D. Schneble, *Nature* **559**, 589 (2018)

¹This work is supported by the National Science Foundation, Grant No. PHY-1607633

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Date submitted: 01 Feb 2019

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