

Abstract Submitted
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Quantum Optics with Matter Waves¹ MICHAEL STEWART,
LUDWIG KRINNER², JOONHYUK KWON, ARTURO PAZMINO, ALFONSO
LANUZA, XIAOYU YANG, DOMINIK SCHNEBLE, Stony Brook University —
Ultracold atoms in optical lattices realize a tunable open quantum system in the
context of matter-wave emission into vacuum. We have recently realized such a
quantum optical system and demonstrated [1] that it can be used to study emission
phenomena in a wide range of parameter regimes, including those which are difficult
to access in analogous optical cases, e.g. photonic band gap materials. We describe
our experiments and theoretical modeling in detail and present further progress with
our novel platform.

[1] L. Krinner, M. Stewart, A. Pazmio, J. Kwon, D. Schneble, *Nature* **559**, 589
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²Current address: Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

Michael Stewart
Stony Brook University

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