Abstract Submitted  
for the DAMOP19 Meeting of  
The American Physical Society

**Filling-fraction dependent emission in a matter-wave emitter array**¹  
JOONHYUK KWON, MICHAEL STEWART, 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 [1]. Previously, we observed deviations from single-particle dynamics in sparsely populated emitter arrays, due to atom reabsorption. Moreover, for arrays with large filling fractions, superradiant emission effects have been predicted [2]. We present an experimental investigation of the decay dynamics as a function of the filling fraction of the initial state in our optical lattice system.


¹NSF PHY-1607633

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Date submitted: 01 Feb 2019  
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