

Abstract Submitted  
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**Atom Pairing in Optical Superlattices**<sup>1</sup> JAYAMPATHI KANGARA,  
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JOHN THOMAS, Department of Physics, North Carolina State University — We  
study the pairing of fermions in a one-dimensional optical superlattice of double-  
well potentials with tunable asymmetry. Radio frequency spectroscopy reveals the  
coexistence of two types of atom pairs with different symmetries for their center  
of mass wave functions. Our measurements are in excellent quantitative agreement  
with a multi-band model of the spectra, comprising hundreds of discrete transitions,  
with symmetry-dependent initial state populations and transition strengths. Our  
work provides an understanding of the elementary pairing states in a superlattice,  
paving the way for new studies of strongly interacting many-body systems.

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