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Atom Pairing in Optical Superlattices[1] JAYAMPATHI KANGARA, CHINGYUN CHENG, SAEED PEGAHAN, ILYA ARAKELYAN, JOHN THOMAS, Department of Physics,North Carolina State University, JETLAB TEAM — We study the pairing of fermions in a one-dimensional optical superlattice of tunable double-well potentials using radio frequency spectroscopy. The observed spectra reveal 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 the predicted 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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