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Enhanced Superconductivity in Superlattices of High- T_c Cuprates

SATOSHI OKAMOTO, THOMAS MAIER, Oak Ridge National Laboratory — We investigate the electronic properties of multilayers of strongly correlated models for cuprate superconductors using cluster dynamical mean-field techniques. We focus on combinations of underdoped and overdoped layers and find that the superconducting order parameter in the overdoped layers is enhanced by the proximity effect of the strong pairing scale originating from the underdoped layers. The enhanced order parameter can even exceed the maximum value in uniform systems. This behavior is well reproduced in slave-boson mean-field calculations which also find higher transition temperatures than in the uniform system. This work was supported by the Division of Materials Sciences and Engineering, Office of Basic Energy Sciences, U.S. Department of Energy. A portion of this research at Oak Ridge National Laboratory's Center for Nanophase Materials Sciences was sponsored by the Scientific User Facilities Division, Office of Basic Energy Sciences, U.S. Department of Energy.

Satoshi Okamoto
Oak Ridge National Laboratory

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