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**Interface Formation for a Ferromagnetic/Antiferromagnetic Bi-layer System Studied by Scanning Tunneling Microscopy and First Principles Theory** ANDRADA-OANA MANDRU, JONATHAN GUERRERO-SANCHEZ, JEONGIHM PAK, NOBORU TAKEUCHI, ARTHUR SMITH, Nanoscale and Quantum Phenomena Institute, Department of Physics and Astronomy, Ohio University, Athens, Ohio 45701, USA — We investigate the initial stages of interface formation for Fe/$Mn_3N_2$(001) ferromagnet/antiferromagnet bi-layer system down to the atomic scale using a combination of molecular beam epitaxy, scanning tunneling microscopy and first principles theoretical calculations. Sub-monolayer iron depositions onto manganese nitride nanopyramid surfaces induce the formation of one monolayer high islands that are present on all terraces. Unexpectedly, the chemical composition of the observed islands does not consist of Fe, as determined using Auger electron spectroscopy, conductance map imaging and theoretical models. Further theoretical calculations reveal how Fe atoms incorporate into specific subsurface layers. In addition, theory finds the magnetic alignment of the Fe atoms within a particular layer and with adjacent $Mn_3N_2$(001) layers. This study suggest that these complex structural arrangements at the interfaces between such magnetic bi-layer systems are important to take into account when considering the exchange coupling between the layers.

Andrada-Oana Mandru
Nanoscale and Quantum Phenomena Institute,
Department of Physics and Astronomy, Ohio University, Athens,
Ohio 45701, USA

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