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Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Strain Energy and Epitaxy Relation between Superconducting Thin Films and Semiconductors¹ KLEA DHIMITRI, Department of Physics, Hunter College, NY , Department of Physics, City College of New York, NY, JOSPEH YUAN, JAVAD SHABANI, Department of Physics, City College of New York, NY , Department of Physics, The Graduate Center, CUNY, NY — Existence of an *epitaxy* relation and domain matching between semiconductors and superconductors offer the ultimate flat and uniform interfaces. Pristine interfaces are much needed for the realization of topological superconductivity and quantum computation. Motivated by recent studies on Al-InAs, we have investigated the interface strain energies in two-dimension for a number of superconductors (e.g. Al and Pb) and semiconductors (e.g. InAs and Si). The strain energy between each pair has been calculated and analyzed up to 100 configurations .Guided by these studies, thin films of Al (111), Al (110), Al (100) on InAs (100), InAs (110), InAs (111) and Si have been grown by molecular beam epitaxy. Our numerical results are compared with details of crystal in-plane directions derived from x-ray diffraction patterns and transmission electron microscope images.

¹We acknowledge support from Army Research Office and Air Force Office of Scientific Research.

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Date submitted: 11 Nov 2016

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