

Abstract Submitted  
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**Room Temperature Antiferromagnetism in c-FeSi** IGOR ALTFEDER, Air Force Research Laboratory — We will be reporting on a recent experimental discovery [1] of a new antiferromagnetic material, having important fundamental and practical implications for nanomagnetism and nanotechnology. Using spin-polarized scanning tunneling microscopy (SP-STM) we observed room-temperature antiferromagnetic spin ordering in thin epitaxial films of c-FeSi on Si(111). Although some earlier GMR experiments [2] clearly indicated such a possibility, antiferromagnetism in this material has never been directly observed or predicted in theory. Using Fe-terminated STM tip, we found unusually high (75%) spin polarization of tunneling current. We also found atomically narrow spin-domain-boundaries, indicating that c-FeSi can be used for atomic scale magnetic memory storage. Our data analysis suggests that c-FeSi represents a Mott-Hubbard antiferromagnet.

[1] Igor Altfeder, Wei Yi, and V. Narayanamurti, “Spin Polarized Scanning Tunneling Microscopy of the Room Temperature Antiferromagnet c-FeSi”, Rapid Communication, Physical Review B 87, 020403(R) (2013).

[2] J. M. Pruneda, R. Robles, S. Bouarab, Ferrer, and A. Vega, “Antiferromagnetic interlayer coupling in Fe/c-SiFe/Fe sandwiches and multilayers”, Phys. Rev. B 65, 024440 (2001).

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