

Abstract Submitted  
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**Magnetic Nanostructures in the Mn-Si system**<sup>1</sup> PETRA REINKE, KIRIL SIMOV, University of Virginia, CATHERINE JENKINS, Advanced Light Source, LBNL — Magnetic doping of group IV semiconductors is coveted for spintronics building blocks. Theoretical assessment of magnetism in Mn-Si is promising, but many of these structures have not been realized yet. Our STM study combines the study of Mn-nanostructure growth on Si(100)(2x1) with the investigation of the magnetic signature with X-ray magnetic circular dichroism and magnetometry. Mn self-assembles into monoatomic chains on the Si(100) surface. The mechanism of chain-formation and its competition with cluster growth will be presented. The nanostructures are capped with a 10 ML Si-or Ge- layer to form delta-doped layers, and protect the Mn-nanostructure. The Mn-chains are preserved, and the growth process for the cap was studied by STM and is now well understood. The magnetic signature is presented for nanowires and nanocluster structures below about 50 K, and a dense array of Mn-chains shows the highest saturation magnetization with 2-3  $\mu_B$  per Mn. The hysteresis loops indicate a superparamagnetic behavior. We will discuss the relative spin-orbital contributions and the directional dependence of the magnetic signature in relation to the Mn-nanostructure geometry.

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