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One-dimensional Mn atom chains templated on a Si(001) surface¹ SIGRUN A. KÖSTER, JAMES H.G. OWEN, FRANÇOIS BIANCO, University of Geneva, Switzerland, ALEX M.P. SENA, DAVID R. BOWLER, University College London/London Centre for Nanotechnology, UK, CHRISTOPH RENNER, University of Geneva, Switzerland — Single-atom chains on a wide gap substrate are a very attractive embodiment of a truly one-dimensional system to explore the remarkable physical properties emerging in such low dimensions. We present self-assembled single-atom Mn chains on a Si(001) surface with Bi nanolines, which serve to increase greatly the average length of the Mn chains. They grow perpendicular to the Si(001) dimer rows, at densities which can be adjusted by means of the growth parameter. High resolution scanning tunneling microscopy (STM) micrographs are in perfect agreement with density functional theory (DFT), providing detailed insight into the chain structure. We further discuss low temperature STM spectroscopy and spin dependent DFT modeling suggesting Mn-chains are indeed a suitable candidate to observe electronic and magnetic properties in one-dimension experimentally.

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