A 1D\textsubscript{s}×1D\textsubscript{c} Heisenberg-Kondo Lattice compound Nb\textsubscript{12}O\textsubscript{29} \textsuperscript{1} WARREN PICKETT, University of California Davis, KWAN-WOO LEE, Korea University — Local moments embedded in conducting systems form a rich platform for unusual phases, with phenomena including Kondo, heavy fermion, and non-Fermi liquid physics. Using first principles based methods and the refined crystal structure based on columns of 3×4 planar units of NbO\textsubscript{6} octahedra, we determine that mixed valent Nb\textsubscript{12}O\textsubscript{29} displays tightly bound local moments forming spin chains along one direction criss-crossed by conducting “nanowires” in the perpendicular direction. Just how local moments — very rare for Nb — emerge and coexist with itinerant electrons, an enigma for decades in this system, is elucidated based on the local structure of the NbO\textsubscript{6} octahedra and orbital+spin ordering. The resulting 1D\textsubscript{s}×1D\textsubscript{c} Heisenberg-Kondo lattice (s=spin, c=charge) picture will be discussed.

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