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Surface phases of the transition metal dichalcogenide IrTe₂¹
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TEAM — Transition metal dichalcogenides have received great attention because of
their fertile properties. The bulk of IrTe₂ exhibits first-order structural transitions
from the expected trigonal structure at room temperature to unusual quasi-one-
dimensional striped structure at low temperature. We have investigated, using low
energy electron diffraction (LEED) and scanning tunneling microscopy (STM), the
surface structural properties of IrTe₂. We observe complex striped lattice modula-
tions as a function of temperature via cooling and warming processes, including 5x1
and 8x1 phases seen in the bulk. The ground state at the surface is 6x1 phase, not
seen in the bulk, and the surface transition temperatures are distinct from the bulk.
The broken symmetry at the surface creates a quite different phase diagram, with
the coexistence of several periodicities resembling a devil's staircase phenomena.

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