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Two-channel Kondo physics from arsenic bond oscillations in zirconium arsenide selenide STEFAN KIRCHNER, Center for Correlated Matter, Hangzhou, TOMASZ CICHOREK, L. BOCHENEK, Institute of Low Temperature and Structure Research, Polish Academy of Sciences, MARCUS SCHMIDT, Max-Planck-Institute for Chemical Physics of Solids, Dresden, Germany, RAINER NIEWA, Institute of Inorganic Chemistry, University of Stuttgart, Germany, A. CZULUCKI, G. AUFFERMANN, FRANK STEGLICH, RUEDIGER KNIEP, Max-Planck-Institute for Chemical Physics of Solids, Dresden, Germany — The two-channel Kondo effect is a fascinating but extremely fragile many-body state that has been theoretically discussed extensively. we address metallic compounds of a specific (PbFCl) structure for which a $-AT^{1/2}$ term to $\rho(T)$ is frequently observed, in line with the two-channel Kondo effect. The origin of this anomalous behavior has remained enigmatic since here, solely the interaction between electrons may account for this behavior, and the two-channel Kondo state is not expected to occur. By combining chemical and structural investigations with various physical property measurements we show that the magnetic field-independent $-AT^{1/2}$ term to the low-T resistivity observed over two decades in $ZrAs_xSe_y$ with $1.90 \leq x + y \leq 1.99$ originates from vacancies in the layer exclusively built up by As. Furthermore, we can trace back the two-channel Kondo effect in this material to a dynamic Jahn-Teller effect operating at these vacancies. All physical properties of the investigated compounds support this conclusion. Our findings will be relevant also for other metallic systems with pnictogen-pnictogen bondings, e.g., cage-forming compounds like the skutterudites.

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