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$H_{c2}(0)$ and the Kondo Effect in $FeSe_{0.1}Te_{0.9}$ Epitaxial Films NICHOLAS CORNELL, ANVAR ZAKHIDOV, UT Dallas, MARCELO JAIME, MPA-CMMS, LANL, JIJIE HUANG, HAYAN WANG, TAMU, MYRON SALAMON, UT Dallas — High-quality, [001]-oriented epitaxial films of $FeSe_{0.1}Te_{0.9}$ have been grown on $SrTiO_3$. They are found to have increased critical temperatures and critical fields relative to both bulk samples and thin films of the sister compound, $FeSe_{0.5}Te_{0.5}$. Critical field values in excess of 114 T have been reported based on WHH theory. In addition to these improved properties, most samples show resistance minima above T_c, reminiscent of the Kondo effect, presumably from excess Fe. We report results of a high field investigation of these thin films that reveals an empirical zero-temperature value of $H_{c2}(0) \approx 46$ T along [001], significantly less than the WHH estimate, but still exceeding the maximum strong coupling correction to the Pauli limit. Large negative magnetoresistance above the critical field confirms the presence of Kondo behavior in the normal state and persists without saturation up to 60 T. Why the measured critical field exceeds the paramagnetic limit remains a question. However, a Kondo temperature that exceeds the superconducting T_c can lead to overestimated WHH upper critical fields and could explain the wide variation in T_c and H_{c2} among the "11" iron chalcogenides.

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