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**Giant piezoresistive response in SmSe thin films under uniaxial strain** MARCELO KURODA, MATT COPEL, THOMAS SHAW, XIAO HU LIU, GLENN MARTYNA, DENNIS NEWNS, IBM T.J. Watson Research Center — Mixed valence compound SmSe shows a continuous insulator to metal transition which has been widely studied in bulk materials during the 1970's and 1980's. Here we report that the effect remains observable experimentally in SmSe films as thin as 12 nm. Our results indicate that the resistivity of film (when subject to uniaxial strain) reduces by about three orders of magnitude under a 4% change volume. This piezoresistive response in SmSe thin films is nearly half of that reported for bulk crystals [Jayaraman et al., PRL **25**, 1430, (1970)]. The experiments are quantified using a combination of finite-element and first-principles (FP-LAWP) calculations. We compare the cases of isotropic and uniaxial strain along specific directions in SmSe crystals and discuss its impact in electronic transport. The results demonstrate the potential of rare-earth monochalcogenides as promising materials for new generation of electronic switches and MEMs [Newns et al., Adv. Mat. **24**, 3672 (2012)].

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