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Tuning the electronic structure in nearly gapless HgCdTe with temperature: infrared magneto-spectroscopy study SEONGPHILL MOON, Natl High Magnetic Field Lab, Florida State University, M. MARCINKIEWICZ, C. CONSEJO, S. RUFFENACH, W. KNAP, F. TEPPE, Laboratoire Charles Coulomb, University of Montpellier, France, J. LUDWIG, Natl High Magnetic Field Lab, Florida State University, K. THIRUNAVUKKUARASU, D. SMIRNOV, National High Magnetic Field Laboratory, S. KRISHTOPENKO, V. I. GAVRILENKO, Institute for Physics of Macrostructures, Nizhni Novgorod, Russia, S. A. DVORETSKII, N. N. MIKHAILOV, Rzhanov Institute of Semiconductor Physics, Novosibirsk, Russia — Replace this text with your abstract body. Recently, a temperature-induced transition from a conventional two-dimensional semiconductor to a topological insulator has been demonstrated through magneto transport studies on HgTe/CdHgTe quantum wells [Wiedmann, S. et al. Phys. Rev. B 91, 205311 (2015)]. Here we report on a temperature-driven semiconductor-to-semimetal transition in 3-dimensional CdxHg1-xTe (x=0.15) revealed by infrared magneto-spectroscopy. We show that changing the temperature from 4K to 120K enables continuous tuning of the band structure from inverted to normal alignment through a critical gapless state realized at ˜80K, where the inter-Landau level transitions exhibit a characteristic sqrt(B) dependence intersecting at zero energy. Using an effective Dirac model, we determine the effective mass and the Fermi velocity for the studied temperature range.

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