Two-gap superconductivity in Cu$_{0.09}$TiSe$_2$ via penetration depth measurements SOURAV MITRA, Nanyang Tech Univ, GREGORY MAC-DOUGALL, DALE HARLINGEN, University of Illinois at Urbana-Champaign, ELBERT CHIA, Nanyang Tech Univ — TiSe$_2$ is an example of a transition-metal dichalcogenide, in which Cu intercalation systematically suppresses the charge-density-wave transition temperature and gives rise to superconductivity. We report magnetic penetration depth measurements of Cu$_{0.09}$TiSe$_2$ (from 350 mK to $T_C = 3$ K), using a self-made high sensitivity tunnel-diode-based oscillator setup. Our analysis of the normalized superfluid density data points to a two-gap isotropic s-wave scenario, with the smaller gap $\Delta_1(0) = 1.2k_B T_C$, and the larger gap $\Delta_2(0) = 2.0k_B T_C$. Our proposed two-gap scenario is supported by ARPES (that clearly shows two Fermi sheets for Cu$_x$TiSe$_2$) and muon spin rotation data.