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Temperature Dependent Anisotropy of Oxypnictide Superconductors Studied by Torque Magnetometry STEPHEN WEYENETH, Physics Institute, University of Zurich, 8057 Zurich, Switzerland, ROMAN PUZNIAK, Institute of Physics, Polish Academy of Sciences, 02-668 Warsaw, Poland, NIKOLAI D. ZHIGADLO, SERGIY KATRYCH, ZBIGNIEW BUKOWSKI, JANUSZ KARPINSKI, Laboratory for Solid State Physics, ETH Zurich, 8093 Zurich, Switzerland, URS MOSELE, STEFAN KOHOUT, JOSEF ROOS, HUGO KELLER, Physics Institute, University of Zurich, 8057 Zurich, Switzerland — Single crystals of different oxypnictide superconductors of the family $ReFeAsO_{1-x}F_y$ (Re = Sm, Nd, Pr) with various carrier dopings and with masses $m \simeq 100$ ng have been investigated by means of torque magnetometry. We present most recent data, obtained by using highly sensitive piezoresistive torque sensors from which the superconducting anisotropy parameter γ and the in-plane magnetic penetration depth λ_{ab} were extracted. As an important result γ was found to increase strongly as the temperature is decreased from T_c down to low temperatures. This unconventional temperature dependence of γ is similar to that observed in the two-band superconductor MgB_2 and cannot be explained within the classical Ginzburg-Landau model. This scenario strongly suggests a new multi-band mechanism in the novel class of oxypnictide high-temperature superconductors.

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