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Disorder induced transition between $s_\pm$ and s_{++} states Fe-based superconductors[1] M.M. KORSHUNOV, Kirensky Institute of Physics, Krasnoyarsk 660036, Russia, D.V. EFREMOV, O.V. DOLGOV, Max-Planck-Institut FKF, D-70569 Stuttgart, Germany, A.A. GOLUBOV, Faculty of Science and Technology and MESA+ Institute of Nanotechnology, University of Twente, The Netherlands, P.J. HIRSCHFELD, Department of Physics, University of Florida, Gainesville, Florida 32611, USA — The symmetry and structure of the superconducting gap in recently discovered Fe-based materials is one of the main challenges in this exciting new field (see, e.g. P.J. Hirschfeld, M.M. Korshunov, and I.I. Mazin, Rep. Progr. Phys. 2011). We have reexamined the problem of disorder in 2-band superconductors, and shown within the framework of the T-matrix approximation that the suppression of T_c can be described by a single parameter depending on the intra- and interband impurity scattering rates. T_c is shown to be more robust against nonmagnetic impurities than would be predicted in the trivial extension of Abrikosov-Gor'kov theory. We find disorder-induced transition from the $s_\pm$ state to a gapless and then to a fully gapped s_{++} state, controlled by the sign of the average coupling constant.

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Maxim Korshunov
Kirensky Institute of Physics, Akademgorodok, Krasnoyarsk 660036, Russia

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