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Role of Dirac cones in magneto-transport properties of REFeAsO (RE=rare earth) oxypnictides[1] FABIO BERNARDINI, CNR-IOM and University of Cagliari, 09042 Monserrato (CA), Italy, ILARIA PALLECCHI, FEDERICO CAGLIERIS, ANDREA PALENZONA, GIANRICO LAMURA, CNR-SPIN and University of Genoa, Via Dodecaneso 33, 16146 Genova, Italy, SANDRO MASSIDDA, CNR-IOM and University of Cagliari, 09042 Monserrato (CA), Italy, MARINA PUTTI, CNR-SPIN and University of Genoa, Via Dodecaneso 33, 16146 Genova, Italy — Dirac cone (DC) states are one of the most intriguing issues in condensed matter physics. Abrikosov showed that DC states can be identified by the low temperature behavior of the magneto-resistance. In additon to the usual quadratic dependence of (ρ(H)-ρ(H=0))/ρ(H=0) on magnetic field, a linear dependence appears in the presence of DC states. Such a behavior was discovered in experiments of magneto-resistance in BaFeAs and Pr(Ru,Fe)AsO supporting the existence of DC states in other iron-pnictides superconductors too. Here we investigate the issue of DC states in iron oxypnictides of composition REFeAsO (RE=rare earth). We carry out both ab-initio calculations of the band structure, which evidence the presence of mildly anisotropic Dirac cones along the Y-Γ and Z-R directions of the reciprocal space and we explore transport behavior by means of resistivity, Hall resistance and magneto-resistance measurements, which confirm the dominant role of Dirac cones. By combining our theoretical and experimental approaches, we extract information on effective masses, scattering rates and Fermi velocities for different rare earth elements.

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