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Very large Rashba coupling by a staggered crystal field in the inversion-symmetric $BaNiS_2$ semi-metal[1] ANDREA GAUZZI, DAVID SANTOS-COTTON, MICHELE CASULA, IMPMC-Sorbonne Universits, GABRIEL LANTZ, LPS-Universit Paris Sud, YANNICK KLEIN, IMPMC-Sorbonne Universits, EVANGELOS PAPALAZAROU, MARINO MARSI, LPS-Universit Paris Sud — By means of a single-crystal angular resolved photoemission spectroscopy study combined with first principles calculations, we give evidence of a giant Rashba coupling $\alpha_R \approx 0.25$ eV Å leading to an energy splitting as large as $\Delta\epsilon \approx 150$ meV in a novel situation of an inversion-symmetric system - the $BaNiS_2$ semi-metal - composed of comparatively light elements. This finding is explained by a huge staggered crystal field ≈ 1.4 V/Å associated with a peculiar non-symmorphic square-pyramidal structure, which produces a local inversion asymmetry at the Ni site. We show that this very effective mechanism of Rashba coupling enables large changes of the electronic structure of solids without using either heavy elements or external fields.

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