Microscopic calculation of Rashba spin-orbit torques JUNJI FUJIMOTO, Osaka University, HIROSHI KOHNO, Nagoya University — We study current-induced spin-orbit torques (Rashba torques) in a two-dimensional Rashba ferromagnet, which may model the interface of the ferromagnetic and heavy paramagnetic metals. Using the linear response theory and the Green’s function method and treating the nonmagnetic impurity scattering in the self-consistent Born approximation with ladder-type vertex corrections, we calculate the Rashba torques as functions of magnetization direction, strength of the spin-orbit coupling, and the chemical potential. It is found that the Rashba torques are independent of the direction of the magnetization for a parabolic dispersion in good metals, whereas they show a clear angular dependence for a tight-binding model. We will discuss our results comparing with other theoretical calculations [C. O. Pauyac, X. Wang, M. Chshiev and A. Manchon, Appl. Phys. Lett. 102, 252403 (2013), K.-S. Lee, et al, arXiv:1409.5600] and the recent experiments.

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