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Spin-dependent low-energy $^4He^+$ ion scattering on non-magnetic surfaces[1] TAKU SUZUKI, YASUSHI YAMAUCHI, SYUNICHI HISHITA, National Institute for Materials Science — We investigated electron-spin-polarized $^4He^+$ ion scattering on various non-magnetic surfaces at kinetic energies below 2 keV [1]. It was observed that the scattered He^+ ion yield depends on the He^+ ion spin. We interpret this spin-dependent scattering in terms of the spin-orbit coupling (SOC) that acts transiently on the He^+1s electron spin in the He^+-target binary collision. This interpretation qualitatively explains the relationship between the spin-dependent scattering and the scattering geometry, incident velocity, and magnetic field arrangement. This is the first study to report SOC caused by projectile electron spin in ion scattering.

[1] T.Suzuki, Y.Yamauchi, and S.Hishita, Phys.Rev.Lett. 107(2011)176101.

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