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Generation of spin currents due to mechanical rotation MAMORU MATSUO, Kyoto Univ., ASRC-JAEA, JUN'ICHI IEDA, ASRC-JAEA, CREAST-JST, EIJI SAITOH, ASRC-JAEA, IMR Tohoku Univ., CREST-JST, SADAMICHI MAEKAWA, ASRC-JAEA, CREST-JST — In the frontier of spintronics, much attention is paid on the control and generation of spin currents. Due to the exciting progress of nanomechatrononics, the importance of mechanical manipulation of electron spin will increase. We discuss theoretically effects of mechanical rotation on spin currents using generally covariant Dirac equation with gauge fields in the non-relativistic limit. We derive semi-classical equations of motion for a wavepacket of electrons in two dimentional planes subject to the spin-orbit interaction argumented by a mechanical rotation. We show that a circular spin current is created by the mechanical rotation with a magnetic field. The magnitude of the spin current becomes $10^8 \mathrm{A/m}^2$ in Pt with the magnetic field $\approx$ 1T and the rotational velocity $\approx$ 1kHz.

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