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Generation of Spin and Orbital Current in Carbon Nanotubes by Spin-rotation Coupling MASATO HAMADA, SHUICHI MURAKAMI, Tokyo Institute of Technology — Spin-rotation coupling represents a coupling between the electron spins and mechanical rotations, and may be used for generation of spin currents by mechanical rotation. In our presentation we consider carbon nanotubes, and use one of the phonon modes called a twist mode. This mode gives rise to a rotation around the tube axis and eventually an effective Zeeman field parallel to the axis is generated by spin-rotation coupling. We calculate a generated spin current by solving the spin diffusion equation. In addition to the effective Zeeman field along the axis, the rotation also generates an effective orbital magnetic field in the radial direction. We calculate diamagnetic susceptibility for the radial magnetic field, and discuss the generated orbital current.

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