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Superconducting quantum spin-Hall systems with giant orbital g-factors[1] EWELINA HANKIEWICZ, ROLF REINTHALER, GRIGORY TKACHOV, Wurzburg University, Germany — Topological aspects of superconductivity in quantum spin-Hall systems (QSHSs) such as thin layers of three-dimensional topological insulators (3D Tis) or two-dimensional Tis are in the focus of current research. Here, we describe a novel superconducting quantum spin-Hall effect (quantum spin Hall system in the proximity to the s-wave superconductor and in the orbital in-plane magnetic field), which is protected against elastic backscattering by combined time-reversal and particle-hole symmetry [1]. This effect is characterized by spin-polarized edge states, which can be manipulated in weak magnetic fields due to a giant effective orbital g-factor, allowing the generation of spin currents. The phenomenon provides a novel solution to the outstanding challenge of detecting the spin-polarization of the edge states. Here we propose the detection of the edge polarization in the three-terminal junction using unusual transport properties of superconducting quantum Hall-effect: a non-monotonic excess current and a zero-bias conductance splitting. [1] R. W. Reinthaler, G. Tkachov, and E. M. Hankiewicz Phys. Rev. B 92, 161303(R) (2015)

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