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Asymmetries in electron spin resonance signal of magnetized spin chains and quantum wires due to spin-orbital interactions SUHAS GANGADHARAIAH, University of California, Irvine, OLEG STARYKH, University of Utah, Salt Lake City — We discuss consequences of the symmetry breaking Zeeman and uniform Dzyaloshinskii-Moriya (DM) terms for the electron-spin-resonance (ESR) measurements in a spin-1/2 Heisenberg anti-ferromagnetic spin chain. At the non-interacting level, a non-orthogonal orientation of the magnetic field and DM vector leads to a sharp delta-function ESR signal for the right and left moving excitations. The peak positions and their intensities generally differ, and can serve as a possible chiral probe for the two excitations. Similar results hold for a magnetized quantum wire with spin-orbit terms. Including a momentum dependent fluctuations in the spin-orbit coupling smears the delta-function and instead results in an asymmetric square root singularity. We discuss the role of temperature and interactions in the further modification of the ESR signal.

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