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Half-metallic d-wave Josephson junctions HENRIK ENOKSEN, JACOB LINDER, ASLE SUDBØ, Department of Physics, Norwegian University of Science and Technology, N-7491 Trondheim, Norway — We examine the dc Josephson effect in a ballistic superconductor/half-metal/superconductor junction by means of the Bogoliubov–de Gennes equations. We study the role of spin-active interfaces and compare how different superconductor symmetries affect the Josephson effect. We analyze critical current as a function of junction width, spin-flip strength and direction, and temperature. We show that the temperature-dependence of the supercurrent in the d_{xy}-symmetry case differs qualitatively from the s- and $d_{x^2-y^2}$-symmetries. Finally, we have found a general analytical expression for the Andreev Bound State-energies which shows how we can either induce $0-\pi$-transitions, or continuously change the ground state phase of the junction by controlling the magnetic misalignment at the interfaces.

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