

Abstract Submitted  
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**Theory of long range superconducting proximity effect in half-metallic ferromagnets: the role of disorder**<sup>1</sup> MATTHIAS ESCHRIG, TOMAS LOFWANDER, Institut fuer Theoretische Festkoerperphysik, University of Karlsruhe — A Josephson supercurrent between two singlet superconducting electrodes separated by half-metallic CrO<sub>2</sub> has been recently reported. Only conduction electrons with equal spins can be paired in a half metal. Both the mechanism involved in the conversion process from singlet to equal spin Cooper pairs at the interface, as well as whether the symmetry of the pairing correlations in ferromagnets is odd-frequency s-wave or even frequency p-wave for different amounts of disorder, are subjects currently under debate. We report an extensive theoretical investigation of the Josephson effect through half-metals with arbitrary impurity concentration. We discuss a model for the conversion mechanism between the singlet and triplet supercurrents at the interfaces and we analyze the symmetry of the pairing components that contribute to the supercurrent in the entire range from ballistic to diffusive transport.

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Matthias Eschrig  
Institut fuer Theoretische Festkoerperphysik, University of Karlsruhe

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