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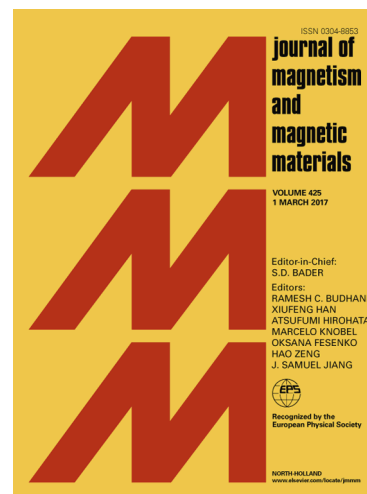
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# Magnetoresistance in magnetite film: a theoretical and experimental investigation

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## ABSTRACT

Functional dependence of magnetoresistance on external magnetic field is of great importance for not only discovering the origin of electrical transport but also tailoring materials for advanced properties in magnetic-field-controlled devices. By utilizing the magnetic domain-rotation model combined with antiphase boundary and charge carrier hopping theories, the formular description of magnetoresistance in magnetite ( $\text{Fe}_3\text{O}_4$ ) film has been studied systematically. The calculation shows that the magnetoresistance depends linearly and quadratically on the external magnetic field when the fields are applied parallel and perpendicular to the  $\text{Fe}_3\text{O}_4$  film plane, respectively. We give the experimental MR data to verify these theoretical results.

**Keywords:** Film; Magnetic materials; Spin-polarized transport; Magnetoresistance

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