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【716】 Imaging the Magnetization Process of Large Grain Silicon Steel using Polarized Neutrons

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Grain-oriented silicon steels are established as high performance magnetic core materials in transformers. Their large crystal grains with strong texture gives them pronounced uniaxial magnetic properties. Polarized neutron imaging is capable of investigating the bulk magnetic properties with spatial resolution. The technique is capable sensitive to magnetic order and disorder in the form of spin rotation and depolarization, respectively. Here we present a spin-rotation analysis of the remanent state of a silicon steel-sheet and depolarization data showing the magnetization process. The experiments were performed with a custom magnetic environment, which was designed and evaluated using finite element field calculations and Monte Carlo simulations of the neutron spin evolution.

Theoretical Work

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