From the Planetary to the Nanoscale: Magnetism at the Interface

Scheda informativa

Informazioni relative al progetto

PNMI

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Obiettivo

Magnetic anomalies from deep sources are commonly thought to be induced by the present Earth’s field to magnetite bearing rocks. Such magnetism is limited by the Curie isotherm of magnetite related to the local thermal gradient. The proposed research challenges this picture and is important for understanding large scale crustal anomalies. Natural rhombohedral oxides of the Fe2O3-FeTiO3 solid solution series with fine-scale exsolution intergrowths can retain a strong and very stable magnetic remanence to higher temperatures than magnetite. Their remanence can be important in the magnetism of crust at depth which currently is intensely investigated by satellite surveys on Earth and on extraterrestrial bodies. Two challenges stand out for understanding magnetism at high pressure and temperature. First, stability of nanoscale mineral intergrowths should be explored in experimental runs, followed by close examination of results under room-temperature
conditions by EMP and TEM. Second, the direct effect of pressure and temperature on magnetic properties of single phases, solid solutions, and intergrowths must be investigated. This requires direct observations at pressure and temperature. BGI has a phenomenal background in high-pressure experiments at crustal conditions. It also has excellent background and equipment for exploring materials before and after experiments using electron microprobe, X-ray diffraction and high-resolution TEM. A Mössbauer- spectroscopy system through a diamond-anvil cell at pressure and temperature will allow direct recording of magnetic transitions under deep crustal conditions. To come into conjunction with these special capabilities and these highly advanced scientists in complementary, but different fields of science, will provide a unique opportunity for my research and career to move ahead towards an understanding of magnetic behaviour of the deep crust. This will lead to more definitive results in interpretation of deep-seated anomalies.

Programma(i)

Argomento(i)

Invito a presentare proposte

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Coordinatore

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Contatta l’organizzazione

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