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Advanced Research Lab / Master's Student

The demand for high-performance permanent magnets has increased significantly due to their essential role in various applications, such as electric motors and renewable energy systems. NdFeB (Neodymium-Iron-Boron) magnets, known for their superior magnetic properties, are particularly sought after. However, achieving optimal performance requires careful control of the production processes involved.

This study aims to process NdFeB powders obtained from jet milling to produce high-performance anisotropic sintered magnets. We will investigate various magnetic properties, including coercivity (Hc), residual induction (Br), domain structure, and the degree of alignment of the final products.

New students will gain hands-on experience in materials science and engineering. They will apply advanced techniques in NdFeB magnet production, enhancing both their theoretical knowledge and practical skills.

Experience to be gained:

- Experience on industrially relevant preparation routes → induction/arc melting /Melt spinning/jet milling
- powder x-ray diffraction (XRD)→ structural properties, phase identification
- Scanning Electron Microscopy (SEM) and energy dispersive x-ray (EDX) analysis→ Microstructure analysis and chemical composition determination.
- MOKE (Magneto-Optical Kerr Effect) → imaging of magnetic domains and their dynamics
- Differential Thermal Analysis (DTA) → Identification of heat changes and phase transitions
- Vibrating Sample Magnetometer (VSM)→ Magnetic property determination
- HyMPulse magnetic properties tester-Metis → Characterizing magnetic materials

[1] Opelt, K.,et al. *Advanced Engineering Materials*, *23*(10), 2100459.
[2] Mo, Chih-Chieh, et al. *Journal of Magnetism and Magnetic Materials* 603 (2024): 172281

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Documents required for application:
1. Current CV,
2. Up-to-date transcripts of Bachelor and Master semesters,
3. Motivation letter.