Nanostructured materials | Jožef Stefan Institute Ljubljana, Slovenia

Open MSc position:
”Development of Fe–Cr–Co–Mo permanent magnets via sintering for rare-earth-free applications

Topic description:
The growing demand for sustainable energy technologies requires the development of efficient magnetic materials without reliance on critical rare-earth elements. Fe–Cr–Co alloys are promising candidates for such applications, offering good magnetic performance combined with mechanical robustness and corrosion resistance.

Magnetic properties in Fe–Cr–Co alloys are strongly influenced by processing, particularly sintering and subsequent heat treatments, which control the formation of an anisotropic microstructure through spinodal decomposition.

The proposed research will focus on the consolidation of Fe–Cr–Co–Mo powder using conventional powder metallurgy. The student will investigate the influence of sintering parameters and heat-treatment routes on densification, microstructure, and magnetic properties. Experimental work will include sample preparation, sintering, heat treatments, and magnetic characterization.

This work contributes to the development of rare-earth-free magnetic materials for sustainable technologies.

Requirements for candidates:
- Bachelor’s degree in Natural Sciences
- Enrolment in master’s study course in Natural Sciences
- Interest in experimental work and materials science
- Knowledge of English

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