MATERIALS SCIENCE AND TECHNOLOGY

MUR DM 117/Stellantis - General context Energy-efficient magnets for automotive applications

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Context of the research activity	Sensors based on magnetic materials together with the rapid growth of electric vehicles are at the base of the continuous demand of better energy efficiency and more resourceful use of soft and hard magnetic materials in automotive. Progetto finanziato nell'ambito del PNRR - DM 117/2023 - CUP E14D23002060004
Objectives	Sensors based on magnetic materials together with the rapid growth of electric vehicles are at the base of the continuous demand of better energy efficiency and more resourceful use of soft and hard magnetic materials in automotive. The electrical energy conversion into mechanical work is performed through electric motors and generators, made of hard and soft magnetic materials respectively. Permanent magnets are the key element to improve the efficiency of electricity transmission. As a consequence, optimizing soft and hard magnetic materials, increasing applicable temperature implies more energy efficient devices. Objective: ¿ To measure the magnetic behaviour of hard and soft magnetic materials of different nature, structures and dimensions in search of the best magnetic performance to maximize energy efficiency. ¿ To obtain progress in magnetic materials have resulted in advances in increasing energy density, reducing rare-earth contents, and lowering eddy current losses. ¿ To improve the magnetization, temperature stability, and operation frequency.
	Skills and competencies required A general background in physics or

Skills and competencies for the development of the activity	materials science is appreciated. The candidates should be highly motivated to join a dynamic environment. Capabilities in team working in a multidisciplinary context are then recommended. The research work will be performed closely in contact with the industrial partner (Stellantis: former Peugeot-FCA), worldwide leader in the automotive sector. One year abroad is part of the program.