

 	<p><b>SUJET DE STAGE</b></p> <p><b>Analysis and measurement of special magnetic alloys with Nickel and Cobalt submitted to specific thermal and surface treatments</b></p> <p>O. MALOBERTI / T. ETIFIER</p>	<p>MASTER M2</p> <p>2020/2021</p>
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**KEYWORDS :** Soft magnetic materials, special alloys, FeCo EFK 502R, FeNi Supra50T, magnetic domains, walls, magnetic measurements, “ring core tester”, “single sheet tester”, AFM/MFM

**CONTEXT :** <https://www.essial.eu/fr>

**GOALS :**

The goal of this internship is to analyze and characterize the magnetic behaviour of special alloys made of Nickel-Iron and Cobalt-Iron; taking into account some dedicated thermal and surface treatments, using single sheets (“single sheet tester”), toroidal magnetic circuits (washers for the “ring core tester”) and following other microscopic observations done with imaging techniques such as the MOIF (Magneto-Optical Indicator Film) and the MFM (Magnetic Force Microscope).

**MISSIONS :**

- Bibliography on magnetic measurements « Ring Core Tester » & « SST »
- Bibliography on soft magnetic materials, special alloys and magnetic measurements
- Modeling of the magnetic behaviour (hysteresis and losses)
- MATLAB/SIMULINK program to simulate the magnetic measurement
- Contribute to the experimental plans (thermal annealing, surface laser treatment ...)
- Carry out macroscopic magnetic measurements
- Identify the model magnetic parameter for each material
- Analyze the microstructures and crystallinity revealed by the partners
- Analyze the magnetic structure with the MOIF or/and MFM images
- Write a scientific and technical report

**EQUIPMENT :** samples (FeNi et FeCo), software (MATLAB/SIMULINK...), ring cores with boxes and windings, Ring Core Tester, Single Sheet Tester.

**EDUCATION :** (Bac + 5) Electrical Engineering, Experimental skills, Material Science, English.

**DURATION :** 3-6 months

**COLLABORATION :** ESIEE Amiens / UPJV / MULTITEL / IRT-M2P

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