

Theme-based objectives and endpoints

- Characterization of low-level and low-frequency magnetic fields (DC-3kHz, μT - nT)
- Identification of electromagnetic sources from external field measurements by resolution of inverse problems
- Attenuation of fields by control of sources and / or by design of passive or active shieldings

ERT-CMF

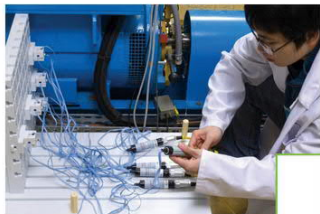
ÉQUIPE DE RECHERCHE
TECHNOLOGIQUE
CHAMPS MAGNÉTIQUES
FAIBLES

Scientific activities

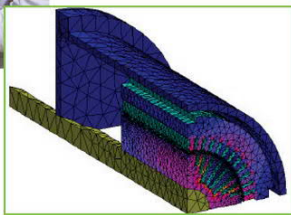
- Electromagnetic discretion of ships,
- Magnetic discretion of electrical equipments (electrical machines, etc.),
- Reduction of stray fields by passive or active shielding,
- Measurement of low-level and low-frequency magnetic fields,
- Monitoring and calibration of sensors
- Diagnosis of electrical systems (alternators, transformers, fuel cell) with leakage magnetic field analysis,
- Diagnosis of corrosion using electric potential measurement
- Prediction of magnetization variations due to the effects of stresses (magnetoelastic model),
- Electromagnetic bioprocess for sewage problems



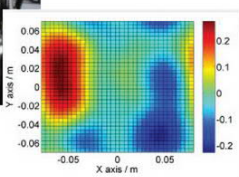
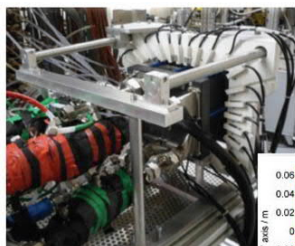
Magnetic State of a aircraft carrier in a earth magnetic field (FLUX software)



Fault monitoring of electrical machine with leakage flux analysis



Current distribution identification in fuel cells stack by measurements of external magnetic field



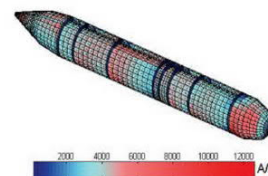
Specific equipment

Low Magnetic Fields Metrology Laboratory (LMMCF) located in Herbeys (10 km from Grenoble, in a magnetically stable environment) and shared with the CEA-LETI

- Magnetic field simulator (2 m diameter, 15 m long) with a very good homogeneity (better than 0.1 %).
- Deperming equipment: 10 square shake coils (1 meter cross section, 4800 A/m) with a frequency from quasi-static (0.01 Hz) up to 40 Hz.
- 100 magnetometers and gradiometers, mostly of fluxgate type (vector measurements), and a high performance data acquisition system is available.
- Metrological Magnetic Characterization Laboratory (LCM).
- A whole set of autonomous and portable equipment to take magnetic measurements on the field.



LMMCF facilities in Herbeys (Grenoble INP / CEA-ETI) Field Simulator and LCM equipment for magnetic characterization



Closed Loop Degaussing of a submarine : Identification of the magnetization form internal magnetic measurements (LOCAP software)

Collaborative projects

University and Publics Agencies

French Ministry of Defense (DGA), Atlantic Submarine Study Groupe (DGA-TN), CEA-LETI, CEA-Liten, GIPSA-lab, LEPMI, LOCIE

Corporate

DCNS, CEDRAT, GeoEnergy, Schneider Electric, Arcelor / Imphy, MécaMagnetic, CNES, Alcan, Alstom, EDF-DTG, Somfy

International

NSWC (USA), Fincantieri (Italy), WTD71 (Germany), MoD/DSTL (UK), CTMSP (Brazil)

