


### Internship proposal 2009-2010

<p><b>Laboratory :</b> ENEA, Superconductivity Division</p> <p><b>Address :</b> Via E. Fermi 45, I-00044 Frascati (Rome)</p> <p><b>Laboratory director :</b> dr. A. della Corte</p>	
<p><b>Internship supervisor :</b> dr. L. Muzzi</p> <p><b>Phone :</b> +39-0694005391</p> <p><b>e-mail:</b> <a href="mailto:muzzi@frascati.enea.it">muzzi@frascati.enea.it</a></p>	

**Study of electromagnetic and mechanical properties of composite superconductors, as a basis for the design of superconducting cables for power applications.**

#### Scientific project :

Low- $T_c$  superconducting materials are still the most widely used in the design and manufacture of high current cables and devices. A complete knowledge of their electrical, magnetic and mechanical properties is essential to attain a robust design of cables and power devices.

The internship programme will focus on the main issues related to the design and manufacture of superconducting cables and of high field magnets or power devices made with them. The study and characterization of the electromagnetic and mechanical properties of the superconducting materials, forming the basis of the design, will be carried out by the candidate in the facilities available at the ENEA Superconductivity Labs. The close collaboration between ENEA and the Italian industry involved in the manufacture of superconducting conductors will allow the candidate to actively experience the real cable production in an industrial environment.

#### Techniques in use :

Electrical and magnetic characterization of superconducting critical field, critical temperature and critical current at liquid helium and at variable temperature, with or without the application of mechanical loads. Structural characterization by Scanning Electron Microscope.

#### Applicant skills :

The applicants are expected to possess an experimental attitude and ability to work in team and in a physics laboratory environment. The basic knowledge of low-resistance measurement techniques and techniques for low temperature physics is envisaged.

**Granted internship :** yes. In addition, support for local transportation and meals

**C'nano IdF laboratory (France only) :** yes / no

**Possibility for a thesis :** yes , financial support possible after selection according to national rules.

Amount of the grant: approximately 13640 €/year (previdential contribution shall be deducted).