Title of the doctoral program
Metrologia

Title of the research activity
Evaluation of thermal effects on metallic prostheses during Magnetic Resonance Imaging sessions

Short description of the research activity
The activity will address the problem of possible thermal effects occurring in presence of implanted metallic prostheses during Magnetic Resonance Imaging (MRI) sessions. Special attention will be paid to the gradient fields, for which a specific experimental set-up will be built. Experimental characterization of the magnetic fields produced by realistic sources, under realistic operating conditions, will be performed. Phantoms mimicking the properties of human tissues, equipped with metallic prostheses, will be employed to reproduce the exposure scenario. The levels of induced temperature elevation will be checked and compared to theoretical predictions based on electromagnetic and thermal models. Possible mitigation strategies will be analyzed.

References:

Scientific tutor (name, surname, role, email)
Luca ZILBERTI, Istituto Nazionale di Ricerca Metrologica, l.zilberti@inrim.it.

Scientific sector (Settore Scientifico Disciplinare - SSD): ING-IND/31 (Elettrotecnica)

Number of international-review papers (last 5 years): 37
Total number of citations and source: 249, google scholar
h-index and source: 8, google scholar

Type of research activity
Experimental laboratory activity (mainly) and modelling activity.

Site of activity
INRIM (Division of Metrology for the Quality of Life).

Active collaboration on the proposed research activity
Physikalisch-Technische Bundesanstalt (PTB), Germany.
ZMT Zurich MedTech AG, Switzerland.
Istituto Ortopedico Rizzoli, Italy.

Specific requirements (experiences, skills)
Master degree in Electrical Engineering or Biomedical Engineering, or Applied Mathematics or Physics.

Website of the research group (if any)
https://www.inrim.eu/research-development/quality-life/biomedical-metrology