Vous êtes cordialement invité(e)s au séminaire :

**Design & Optimization of HTS SQUID based Magnetocardiography (MCG) system using Active shield**

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**Short biography:**

Faezeh Shanehsazzadeh received the B.S. and M.S. degrees from Isfahan University Technology (IUT), Isfahan, Iran, in 2009 and 2012 all in electrical engineering. Her master thesis is about fabrication of high sensitive Hall magnetic sensor with standard CMOS technology. She started Ph.D. in electrical engineering department of Sharif University of Technology (SUT), Tehran, Iran in 2013 under supervision of professor Fardmanesh. She is a member of Superconductor Electronics Research Laboratory (SERL) and head of magnetic sensor group at this laboratory. Also, she is lecturer at SUT since 2015. She is pursuing her PhD project in the field of superconductivity and working on designing a magnetocardiography system using high-\( T_C \) superconducting quantum interference device (SQUID) working out of passively magnetically shield.

**Abstract of the Seminar**

Magnetocardiography (MCG) is a technique for characterization of the magnetic fields created via heart activation currents. This technique is completely passive, noninvasive, and relatively fast process compared to electrocardiography (ECG). It, moreover, appears to be rather sensitive in the early diagnosis of heart diseases, which is also capable of fetal diagnoses. Measuring the extremely weak magnetic fields in the presence of the fluctuating geomagnetic field of about tens of \( \mu T \) intensity and also the man-made electromagnetic noise signals is a dilemma for all biomagnetic imaging applications. It is necessary to suppress the dominant environmental electromagnetic noise by various shielding techniques. Passive and active magnetic and electromagnetic shielding, hardware or software gradiometric configurations, and signal processing are main shielding techniques. In the past ten years, some MCG systems using high temperature (high-\( T_C \)) or low temperature (low-\( T_C \)) superconducting quantum interference device (SQUID) magnetometers inside magnetically shielded rooms (MSR) have been developed. However, in contrast to the presently increasing interest for clinical application of MCG system, instrumentation based drawbacks such as the use of liquid Helium and the need for passive magnetic shielding like MSR are technical challenges of the commercial available liquid Helium based MCG systems. Using high-\( T_c \) SQUIDs, which can operate at the temperature of liquid Nitrogen, while operating outside a MSR by incorporating the active shield system, would have much lower costs and can be more generally available at hospitals and clinics. In this project, we developed a single-channel high-\( T_C \) rf SQUID based MCG system working in magnetically unshielded environment.

**Date :** Jeudi 30 mars à 16h00  
**Lieu :** Salle de réunion du L2E,  
Campus de Jussieu, Couloir 65-66, 1\er\  étage

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