ByAxon nanotech · health

PhD opening – sept 2017

FET open project "***ByAxon" (H2020 program/2017-2020)***

Towards an active bypass for neural reconnection

Magnetic sensors based on AMR effects at low field in manganite thin films

Context:

The ByAxon European project is supported by an interdisciplinary consortium, going from material scientists and electronic experts to biologists and clinicians in order to design and build a prototype of an active implant that could work directly at the spinal cord (SC) level. This implant will be primary focused on restoring the transmission of electrical signals in the injured SC, acting as an active local bypass, something not possible with current technology.

Subject:

The PhD student will join the CNRS research laboratory 'GREYC' in Caen (France) to work on the fabrication and conception of low-field magnetoresistive sensors from $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) manganite thin films. A significant AMR (Anisotropic Magnetoresistive Effect) and a very low electrical noise level at low frequency have been measured in patterned LSMO thin films which make them suitable for the development of new all oxides magnetic sensors. The work concerns the optimization of the magnetoresistive sensing element as well as the low noise electronic conditioning system. Parameters (such as film thickness, geometry of the sensing element, substrate, local nano-patterning, etc.) that control the amplitude of the AMR effect have still to be investigated so as to define an optimized design for a full bridge sensor with targeted sensitivity of $100\mathrm{pT}/\sqrt{\mathrm{Hz}}$ @ 100Hz in a temperature range from 36°C to 39°C.

Specific requirement are related to the detection of electrical signal in the spinal cord, namely the space distribution of the magnetic field produced by the spinal cord signal and the frequency spectrum of the signal to be detected. This subject is thus covering many fields from condensed physics to instrumentation. The candidate will take part to the fabrication of the sensor using the clean room facility available in the lab and will have to make all electrical and magnetic characterization of the successive prototypes.

He/she will use existing set-ups at GREYC such as Pulsed Laser Deposition and related characterization techniques, photolithography equipment, magnetoresistance and low frequency noise measurement set-ups, magneto-optical Kerr effect microscope, low noise measurement equipment.

Required competences:

The candidate must have a background in applied physics and electrical engineering. Specific knowledge in magnetism, materials science or instrumentation will be appreciated.

Experience or competences as an experimentalist are expected.

The candidate should have an independent and efficient working attitude. He/She will participate in the communication of the results and meetings with European partners, may have to perform experiments by partners and must therefore have a good level in English.

She/he is expected to be fluent either in English or in French.

Contract terms:

Location: **GREYC (CNRS UMR6072) – ENSICAEN – Univ. Caen Normandie (France)**

Start: **September 2017** (tentative) Closing date for applications: **31/05/2017**

Duration: **36 months** Net salary: **about 1400 €/month**

Contact:

Please send a CV, a motivation letter and a recommendation letter to

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