

## Job opening: Post-doctoral Position

### Laboratoire Léon Brillouin (CNRS-CEA) – Saclay (France)

Job Description	
Research Project Title	<b>Oxyborate compounds for new multifunctional materials</b>
Research Field(s)	Neutron scattering ; Condensed Matter ; Magnetism
Starting date & Duration	As early as October 2018, 12 months
Project supervisor(s)	Françoise Damay (LLB, Saclay), Christine Martin (Crismat, Caen)

Detailed Job Profile	
<p><b>Scientific Context and Project summary:</b> Recent years have seen a renewed interest for magnetoelectricity, as illustrated by the quickly increasing number of studies devoted to multiferroics materials. These fascinating materials present at least two ferroic orders, amongst the three widely known: ferroelasticity, ferroelectricity, and (anti)ferromagnetism. The coexistence of these two orders brings out multifunctionality, and new cross-coupling effects, that are particularly promising in areas such as data storage and spintronic : magnetoelectric coupling is indeed a key feature for potential applications, enabling the manipulation of magnetization with an electric field and vice versa.</p>	
<p><b>Research Program:</b> The project steps outside the boundaries of the transition metal oxide compounds, mostly studied up to now, to investigate oxyborates with the ludwigite structure <math>M^{3+}(M^{2+})_2O_2BO_3</math> (M is a transition element, divalent or trivalent). It associates mixed valence (di- and tri-valent ions) with a low dimensional network of transition metal atoms. The aim of the project is to characterize in details compounds belonging to this system, to identify new multiferroics/magnetoelectrics. Giant magnetoelectric effects have already been observed in <math>Fe_3BO_5</math>, but vast possibilities remain to induce such an effect by playing with substitution on the 2+ or 3+ sites of another transition element or a rare-earth element, or by random site disorder by a non-magnetic element. On the technical side, the project will rely on the thorough characterizations of chosen oxyborate compositions, combining local and larger scale structural and physical characterization techniques (X-ray and neutron diffraction [LLB]), with physical properties measurements (transport, magnetization, dielectric constant, polarization, specific heat [CRISMAT]).</p>	
<p><b>Candidate Profile:</b> The candidate should hold a Ph.D. in solid-state chemistry or condensed matter physics, with a strong background in magnetism, and be capable of independent research as well as creativity. He/she should have a strong experience in neutron/X diffraction techniques, and powder diffraction data refinements. Experience with large scale facilities and magnetic structure determination would be appreciated. This research project requires a strong taste for experimental research and substantial autonomy. Good communication skills in oral and written English is essential.</p>	
How to apply ?	Applications for this position should be sent by e-mail to <a href="mailto:gregory.chaboussant@cea.fr">gregory.chaboussant@cea.fr</a> and include a C.V., the names of at least two references, and a cover letter summarizing current and future research initiatives.