

Postdoctoral Fellowship at PSI, Switzerland

Theory of optimal frustration for multiferroicity

PSI Fellow 2018 - Project ID 4000-27 (ERC-Marie Curie COFUND Scheme)

This project aims at exploring and optimizing frustration mechanisms that induce incommensurate magnetic spiral order (and thus multiferroic behavior) at high temperatures. This is motivated by the recent experimental discovery of incommensurate magnetic spirals in 3d bulk magnets¹, where a magnetic spiral is induced by chemical defects. The underlying mechanism², a long range order among local frustration patterns (cantings e.g.), has a lot of interesting generalizations, e.g. to disordered spin-ladder systems or Josephson junction arrays. Incarnations in quantum magnets would be interesting to study as well.

Specific research topics are:

- Theoretical study of frustration-induced incommensurate magnetism, and how to optimize it
- Study of magnets of geometrically frustrated lattices. Comparing their potential as multiferroics to the above described chemically frustrated systems
- Link with various experiments at PSI on frustrated magnets, both in 3D and quasi 1D
- Exporting the insight to analogous incommensuration phenomena in ordered phases beyond magnetism: superconductivity, nematics, etc

Interested candidates are encouraged to *add their own ideas on frustrated magnetism and multiferroicity* and to discuss a possible research plan with the Principal Investigator at PSI, Markus Müller, markus.mueller@psi.ch.

Application Schedule:

Deadline: 30th November 2018

Final outcome of application communicated: mid March 2019

Start of project: between 1st May and 1st September 2019

Eligibility criterion (Mobility rule):

Applicants must not have resided or carried out their work in Switzerland for more than 12 months in the 3 years immediately prior to the recruitment date at PSI.

Additional information:

Application process: <https://www.psi.ch/psi-fellow/selection-process>)

Guidelines: <https://www.psi.ch/psi-fellow/guidelines-and-templates-for-applicants>

For the 2-page proposal: https://www.psi.ch/psi-fellow/GuidelinesEN/A06_Guidelines_for_Applicants_2018_FINAL.pdf

If you are interested: Please contact Markus Müller, markus.mueller@psi.ch. to discuss a possible research plan and shaping a common proposal.

¹ M. Morin et al., Nat. Comm. **7**, 13758 (2016); Sci. Adv. (2018) ([arXiv:1809.10395](https://arxiv.org/abs/1809.10395))

² A. Scaramucci, et al., Phys. Rev. X **8**, 011005 ; [arXiv:1610.00784](https://arxiv.org/abs/1610.00784)