

ERC-funded Postdoctoral positions at CRMN Lyon

Pulsed-DNP with Hyperpolarizing Matrices

A **postdoctoral position** is available working in the group of Prof. Sami Jannin (hmrlab.eu) on a project funded by the European Research Council, at the Very High Fields NMR Center (crm-n-lyon.fr) in the city of Lyon, France.

Profile. We are seeking candidates with a Ph.D. in Chemistry or Physics who enjoy synergistic teamwork. **Skills required in instrumental or methodological development in pulsed EPR and/or DNP.**



Project Description. The HypFlow project aims at developing replenishable hyperpolarization by rapid-cycle DNP (ERC CoG HypFlow). In this new DNP approach, samples are repeatedly polarized at 1 Tesla and 77 Kelvin in silica or epoxy-based hyperpolarizing matrices, melted, and flowed towards a benchtop NMR system within a closed loop to repeat the experiment. This hyperpolarization method neither involves contamination nor dilution and is meant to be broadly compatible with conventional multidimensional liquid-state NMR. We have already demonstrated rapid ^1H and ^{13}C enhancements of up to 400 in less than a second with our polarizer. In December 2023, we will receive a pulsed EPR system that we will customize into a pulsed DNP apparatus. This will enable us to push the enhancement limits by using new generations of hyperpolarizing matrices with hyperpolarized electron spin states. The selected candidate will in particular:

- **Be responsible for the Bruker pulse EPR system and co-supervise** PhD students.
- **Participate in the modification of the existing probe** for ^1H NMR (first then ^{13}C CP later).
- Implement existing **pulsed DNP sequences** and perform experiments with available **hyperpolarizing matrices (HYPSOs, HYPOPs)**.
- Push DNP enhancements further with **new generations of hyperpolarizing matrices** (using photoexcited triplet states and/or chiral-induced spin selection).
- **Couple the pulsed DNP system with a rapid melt and flow** system.

Facilities. The Center for Very High Field NMR is one of the world's leading magnetic resonance laboratories, located in the great city of Lyon, which is affiliated with the Lyon-1 University, the CNRS (French National Center for Scientific Research) and the Ecole Normale Supérieure de Lyon. The center has state-of-the-art NMR spectrometers (500 - 700 - 800 MHz, and the world's first 1 GHz spectrometer) and two state-of-the-art dissolution-DNP machines.

Contract. Flexible starting date, up to 5-year extension, including healthcare and other benefits (net income commensurate with experience).

How to apply. Get directly in touch with sami.jannin@univ-lyon1.fr for further details on the position and submit your application via e-mail including a brief statement explaining your background and motivation, your CV, and optionally contact information of 2 references.

Recent publications.

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