

## **INTERNSHIP PROPOSAL**

*(One page maximum)*

Laboratory name: Laboratoire de Physique de L'ENS

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Internship location: ENS/ESPCI

Thesis possibility after internship: YES

Funding: YES

If YES, which type of funding: ERC

### **Quantum sensing of the 21 cm hydrogen line**

The 21 cm hydrogen line is a crucial resource for radioastronomy. The hydrogen element has witnessed many important epochs in the early Universe. The full spectrum of the hydrogen line arising from the red shifted emissions is therefore a highly sought for resource for cosmology and radioastronomy.

In this project which can lead to a PhD, we will use the tools of quantum sensing using superconducting circuits to probe the 21 cm line first for low redshifts and devise techniques to extend this to lower frequencies, suitable for understanding important questions in particular related to dark matter in the early Universe during the Cosmic Dawn.

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: YES      Macroscopic Physics and complexity: NO

Quantum Physics: YES      Theoretical Physics: NO