**ENS / IISER collaboration**

***Internship subject form***

To be sent back for January 31st, 2020

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| Name of the institution | Ecole normale supérieure Paris-Saclay |
| Name of the host laboratory | LUMIN (FRE 2036) |
| Website of the host laboratory | Under construction |
| Research group | NV centers in diamond |
| Internship number | PHYS 2 |
| Internship subject (title) | Investigation of high-Tcsuperconductors at high pressure using NV magnetometry |
| Prerequisites | Quantum mechanics, solid-state physics, optics |
| Internship proposal: description and expected training outcomes (15 lines max.) | Recent experiments on hydride materials compressed to greater than 100 GPa have revealed near-room temperature superconductivity. These pressure conditions can be achieved using a diamond anvil cell (DAC). However, monitoring the properties of the sample inside a DAC is challenging. We developed a monitoring technique based on NV centers in diamond that are created using ion implantation on the anvil culet [1]. The NV centers then act as sensors because their energy levels and the associated spectra are sensitive to strain and magnetic fields. During the internship, the student will implement an efficient microwave excitation using microfabricated antennas engineered on the anvil culet. The microwave field will be mapped using the coherent drive of the NV spin resonance.  [1] M. Lesik et al., Science 366, 1359–1362 (2019) - doi:x10.1126/science.aaw4329 |