



PhD position on the physics of cuprate superconductors at the Sorbonne University, Paris, France

I. Description

Start date: Before 1 December 2022 **Duration:** 3 years

PhD research area: Superconductivity of strongly overdoped cuprates

Recently, it has been found that high-temperature superconductivity up to $T_c \sim 90$ K persists in the high-doping region of some high-pressure oxygenated cuprate compounds for doping levels as high as $p \sim 0.4$ hole/Cu, well beyond the superconducting dome of the phase diagram, where a conventional Fermi liquid behaviour was rather expected.

The properties of cuprates in the above region remain to be largely unexplored. Further progress in the field requires the synthesis of single crystals under high pressure, which will enable us to study systematically the intrinsic electronic and transport properties of the strongly overdoped phases as a function of doping, p , in both normal and superconducting states.

The PhD candidate shall actively contribute to the above research by focusing the Thesis either **(i)** on the high-pressure synthesis and on the structural characterisation of the single crystals or **(ii)** on the study of the physical properties by means of thermodynamic, charge transport, optical conductivity and electronic structure (e.g. ARPES) measurements.

Our group and collaborators have already developed a long-standing expertise in the field, especially regarding the high-pressure synthesis and the measurement of the structural and physical properties of the compounds, including X-ray and neutron diffraction, EXAFS, specific heat, magnetisation, transport and optical spectroscopies.

II. Profile of the ideal candidate

- A strong background in condensed matter of physics or in solid state chemistry, with emphasis on the study of the structural and electronic properties of solids.
- Good experimental skills, especially in high-pressure techniques and/or low-temperature physical property measurements.
- Enthusiasm, curiosity, spirit of initiative and ability to work in a team.

III. Work conditions

World-class level of research activities. Established collaborations with leading researchers in Europe and USA. Possibility of business trips to conferences and scientific visits. Gross salary: 1975 €/month. Possibility to increase the salary by applying for teaching tutor. Work in a stimulating and international environment in the historical *quartier latin* of Paris.

Funding agency: [Agence Nationale de la Recherche](#)

IV. Contact

Candidates are asked to send a motivation letter and a CV to:

Professor [Andrea Gauzzi](#), [IMPMC](#), [Sorbonne Université](#)

Email: andrea.gauzzi@sorbonne-universite.fr

<https://scholar.google.fr/citations?user=5nOVTPMAAAAJ&hl=fr>