

Open Postdoc/PhD position:

Understanding strange metals with nanofabricated resonator structures

Allan lab, Leiden Institute of Physics

We are looking for a PhD student or postdoc for our research group at Leiden University. Our overarching goal is to understand quantum materials, including unconventional superconductors, quantum-critical compounds, strange metals, and topological materials. We are currently looking for new group members with passion, talent, and grit!

This project concentrates on what might be the most mysterious quantum matter: the strange metal phase from which high-temperature superconductivity emerges. Strange metals, as their name suggests, do not conform to the standard models of metallic behavior. They have an electrical resistivity that grows linearly with temperature T right up to their melting point and a mean free path that diminishes to a fraction of the interatomic distance. These striking anomalies are as simple to describe as they are difficult to explain.

The advent of AdS/CFT, however, has changed the theoretical landscape and captured the imagination of theorists and experimentalists alike, to the point where testable predictions are now beginning to emerge. We are part of a broad consortium with leading condensed matter theory and string theory physicists (Zaanen, Schalm, Stoof and Vandoren) as well as with leading experimentalist on complementary probes (Hussey, Golden, vHeumen), and the successful candidate will be in close contact to these groups and the other PhD students hired by the consortium.

This project will focus mainly on making nanofabricated devices and study their transport properties at different frequencies. Much of the cleanroom work will be done through collaborations with the Groups of Groblacher and Norte in Delft.

Additional information (see also allanlab.org):

- *Requirements:* It is required to have a Master degree in Physics. The candidate further requires experience both using PPMS or similar, and solid experience in the Cleanroom. A solid theory background is a plus.
- *Location:* We are a small, dynamic group, currently consisting of three PhD students and the PI. We are located at Leiden University, the birthplace of superconductivity and home to Kamerlingh Onnes, Lorentz, Huygens, Einstein, de Sitter, and others (see e.g. [the wall of signatures from Ehrenfest lecturers](#)). We exchange ideas with our neighbors from [Quantum Matter & Optics](#) as well as with the colleagues from our [world-class theory section](#).
- *Timeline:* We start reviewing applications immediately and until the position is filled (we'll mention this on allanlab.org). The position is initially 1 year, and will be extended if both party are satisfied. The starting date is flexible.
- *Application:* Please send inquiries / applications to allan@physics.leidenuniv.nl. **Important:** write 'Application Postdoc' in the subject line. Attach a motivation letter (max one page) on why you would like to join our group and about your research interests, and a CV.

