

PhD position



Topic

Research into the phenomenon of spin-polarized supercurrents induced in ferromagnets; developing devices to study the interplay between these supercurrents and magnetic domain walls.

Requirements

1. Good command of English (TOEFL ≥ 65 , IELTS ≥ 6)
2. Basic knowledge of and proven interest in condensed matter physics / superconductivity
3. Experimental skills with respect to low-temperature transport measurements

Deadline

31 December 2016

Contact

Prof. Jan Aarts
aarts@physics.leidenuniv.nl

The research

In the last few years, the group has been active in studying the phenomenon of odd-frequency (spin-) triplet correlations, which can be induced in ferromagnets, we use CrO₂ as the magnet, which is fully spin-polarized and allows strong supercurrents to be induced over long lengths (up to a μm). These supercurrents are spin-polarized, and the aim of the current research is to investigate whether and how they interact with magnetic domain walls or nanomagnets in the current path.

For this we have developed methods to grow nanowires of CrO₂ by a chemical vapor deposition method, and we use electron beam lithography to fabricate a variety of device geometries. Basically, these devices, where the ferromagnetic wire is a weak link between superconducting contacts, can be thought of as Josephson junctions. After inducing domain walls in the wire, they are to be measured in transport with a PPMS for temperatures down to 2 K and in a new vector magnet for temperatures down to 300 mK.



**Universiteit
Leiden**
The Netherlands