

## Radboud University, Nijmegen, Institute of Molecules and Materials

### Ph.D. positions in Experimental Condensed Matter Physics: Exploring quantum materials with milliKelvin STM in magnetic fields

The scanning probe department at the Institute of Molecules and Materials (IMM) at Radboud University, Nijmegen invites applications for Ph.D. positions.

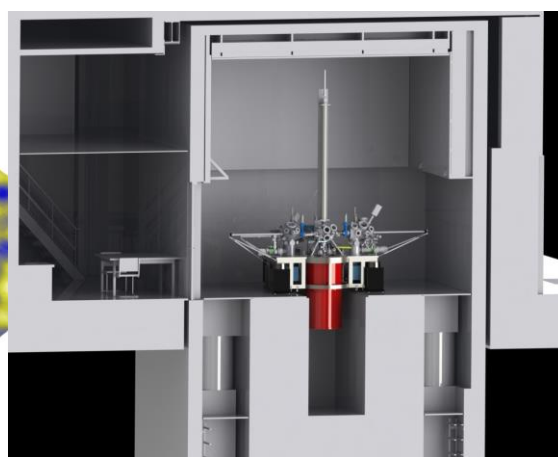
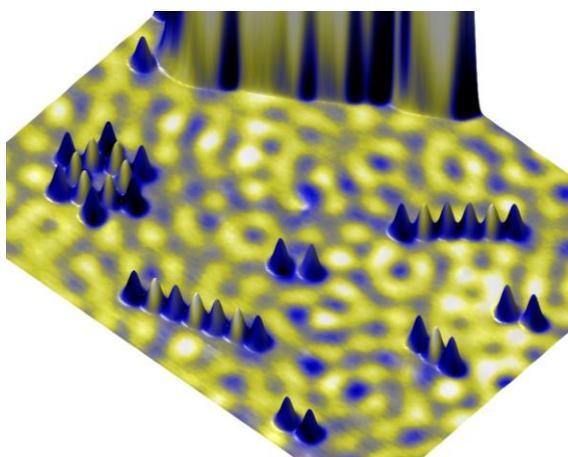
In recent years, it has been shown that scanning tunneling microscopy at ultra-low temperatures and high magnetic fields can be used to detect the magnetic properties of single atoms on surfaces [1-7]. By combining this with atomic-scale manipulation, we have shown examples of how one can tailor single atom magnets [4,6] as well as functional devices such as all-spin logic [5], by utilizing the so-called “spin workbench” technique. The spin workbench allows for novel explorations of a variety of physical problems, by combining spin sensing and magnetic design at the single atom level.

This project focuses on the experimental investigation of how single magnetic atoms and magnetically ordered structures interact with novel quantum materials like 2D materials and superconductors. These studies will be pursued using low-temperature spin-resolved scanning tunneling spectroscopy (30mK – 4K) combined with atomic-scale manipulation, in magnetic fields, *in our newly built SPIN labs*.

- The 4-year position is intended for fall 2015 or winter 2016. Exact dates are negotiable.
- You are expected to carry out experiments and be able to work both independently and in a team, as well as participate in department and institute activities.
- PhD applicants must have a degree equivalent to a “master of physics,” and have written a proper thesis. Master’s students with experimental experience will be preferred. Unqualified candidates will not be considered.
- Experience in either scanning tunneling spectroscopy, preparation/analysis techniques of surfaces in ultra-high vacuum, and/or very low-temperature physics will be strongly preferred.
- You will learn how to operate a UHV-SPM facility
- You will be expected to communicate your results in the form of writing manuscripts and to present at international conferences.
- You will be expected to be knowledgeable about trending scientific literature and to learn proper data analysis skills.
- You will be expected to learn designing skills geared toward SPM research.

Applications will be evaluated on a first come first serve basis. Please submit a one page motivation letter why you would like to join our team, a curriculum vitae, including a minimum of two academic references:

Prof. Dr. Alexander Ako Khajetoorians,  
a.khajetoorians@science.ru.nl  
<http://www.ru.nl/spm/>



[1] A.A.K., et al., *PRL*, 106, 037205 (2011); [2] A. J. Heinrich, et al., *Science*, 306, 466 (2004); [3] A.A.K, et al., *Nature*, 467, 1084 (2010); [4] A.A.K., et al., *Nature Physics*, 8, 497 (2012) [5] A.A.K., et al., *Science*, 332, 1062 (2011), [6] A.A.K., et al., *Science*, 339, 55 (2013), [7] A.A.K., et al., *PRL*, 111, 126804 (2013).