Creating complexity atom-by-atom: toward atomic spin-based neural hardware

PhD & postdoc position available in ultra-high precision scanning tunneling microscopy

WHY:
- New types of hardware are needed to satisfy the demands for pattern recognition and artificial intelligence, due to the increasing energy demands of conventional ICT.
- New hardware designs based on brain-inspired concepts from machine learning can serve as a path toward energy-efficient hardware for pattern recognition.
- Magnetism and spintronic concepts offer a plethora of complex phenomena, potentially suitable for creating neural hardware.
- Scanning tunneling microscopy can be utilized to create tunable coupled magnetic arrays, atom-by-atom, and characterized within one platform to test many new brain-inspired concepts.

WHAT:
- The goal is to create experimental spin model systems to test machine learning concepts routed in magnetism, such as glassy or multi-well systems, and probe their dynamics.
- One postdoc position (2-year), and one PhD position (4-year), to perform experiments utilizing ultra-high precision scanning tunneling microscopy at ultra-low temperature & in magnetic fields.
- You will get to explore atomic-scale spin systems toward understanding the magnetic properties of complex spin networks, as well as their magnetization dynamics.
- You will get to use one of the most advanced compilation of microscopes worldwide, in a very collaborative environment.

HOW/WHERE:
- Get to learn: (1) atomic-scale manipulation, (2) probing spin dynamics with STM, (3) ultra-high resolution scanning tunneling microscopy at mK temperature.
- Experimental background in UHV, cryogenics, and/or scanning probe microscopy, is highly preferred.
- Get to work with world-leading experts in the theory of condensed matter physics as well as theoretical neuroscience and machine learning.
- Work within an excellent team of international scientists, in the Scanning Probe Microscopy department at the Institute for Molecules and Materials (Radboud University): www.ru.nl/spm

WHEN:
- Application open, intended start date is winter 2020, but start date is negotiable in certain cases.

INTERESTED?
- Send an email to Prof. dr. Alex Khajetoorians (a.khajetoorians@science.ru.nl), and include (1) an updated CV with all relevant publications and specify your experimental background, (2) a motivation letter of why you are interested in the position and our research group. (3) At least two references with contact information, reference letters are not required.