

Research Fellow / Senior Research Fellow

The Weber group at Nanyang Technological University seeks a highly qualified Research Fellow to explore topological superconductivity in van-der-Waals materials, heterostructures, and devices. The Research Fellow will be part of a collaborative effort across NTU and A*Star for the scalable design of novel materials and heterostructures, and to explore their potential for applications in topological quantum devices.

The hire is part of a recent major grant award for the realization of topological quantum devices in van-der-Waals materials and devices, with funding available over the next five years. Materials and devices will be characterised in complementary local probe and transport spectroscopies, down to milliKelvin temperatures and in strong magnetic fields.

Central of the project will be a state-of-the-art low-vibration laboratory, hosting a milliKelvin scanning probe microscope, equipped with radio-frequency wiring and vectorized magnetic field, for local probe spectroscopy at <200mK.

We are looking for a high-calibre Research Fellow with the following expertise

Required:

- Proven track record in quantitative scanning probe spectroscopy at cryogenic temperatures of 4.2K and below.
- Proven expertise in setting up laboratories and equipment

Preferred:

- Experience with scanning probe systems at <500mK and in magnetic fields.
- Experience with installing and running of dilution refrigerators
- Synthesis of quantum materials (including 2D van-der-Waals materials) by Molecular beam epitaxy (MBE) or chemical vapour deposition (CVD), and their in-situ structural and electronic characterization in ultra-high vacuum (UHV)

Job Scope / Responsibilities

The successful candidate will aid the programme in one of the following areas:

- Installation, commissioning, and operation of a commercial milliKelvin scanning probe microscope in a custom designed state-of-the art low-vibration laboratory space
- Synthesis and electronic characterization of 2D quantum materials and heterostructures by local probe spectroscopy at milliKelvin temperatures
- Co-supervision of research students
- Preparation of scientific publications

The position comes with internationally competitive remuneration and benefit package, commensurate with experience. The duration of the contract is 1-2 years, based on experience, with option for renewal on a yearly basis, based on performance, until the project expires.

Expiry: position open until filled

Job Requirements:

- A Ph.D. degree in physics is mandatory
- Demonstrated strong experimental skill and track record of research achievements
- Demonstrated ability to publish high-tier research publications
- Excellent verbal and written communication skills (including scientific writing)
- Ability to work independently but also to work as part of a team

Candidates are expected to assume duty any time from their successful hire.

About the PI:

Weber has nearly 15 years of experience in scanning probe microscopy, local probe spectroscopy, and electron transport spectroscopies of material systems relevant to quantum technologies. He obtained his PhD from the Centre for Quantum Computation and Communication Technology at The University of New South Wales (UNSW) in Sydney, where he developed a scanning probe based fabrication scheme for atomically small silicon quantum bits. He later worked as an Australian Research Council (ARC) DECRA Fellow at the Centre for Atomically Thin Materials (MCATM), Monash University, and remains an Associate Investigator within the ARC Centre for Future Low Energy Electronics Technologies (FLEET).

Weber recently moved to Nanyang Technological University as a Nanyang Assistant Professor (NAP) and Singapore National Research Foundation (NRF) Fellow to establishing state-of-the-art local probe and transport spectroscopy facilities for the study of quantum materials for their application in future topological and quantum information devices. Weber's laboratories include capability for UHV low-temperature (4.5K) scanning probe microscopy, molecular beam epitaxy (MBE), angle-resolved photoemission spectroscopy (ARPES), as well as a dilution cryostat for transport spectroscopy at milliKelvin temperatures. A custom-designed vibration-isolation laboratory is currently being constructed that will host a commercial milliKelvin scanning tunnelling microscope (mK-STM) with vector magnetic field.

Weber's work has been published in several high-impact publications (Science, Nature Nanotechnology, Nature Communications, Physical Review Letters, Nano Letters, and more), as well as presented at invited and contributing conferences.

Asst Prof Bent WEBER

Nanyang Assistant Professor & Singapore National Research Foundation (NRF) Fellow, School of Physical & Mathematical Sciences

21 Nanyang Link, PAP-05-01b, Singapore 637371

T 65-6904-1249 b.weber@ntu.edu.sg www.ntu.edu.sg