

The Steinberg Lab in Jerusalem is seeking a post-doc to work on device-based tunneling experiments. We use van der Waals (vdW) devices to measure high resolution spectroscopy in 2D materials. vdW barriers allow for sensitive spectroscopy of layered materials, such as NbSe₂ [1]. This method is used in tunneling spectroscopy at high magnetic fields, and can be extended to carry out out-of-equilibrium spectroscopy in 2D superconductors.

We are also interested in the role played by crystallographic defects, which function as quantum dots embedded in the tunnel barrier. These defects may undergo proximity to the superconductor [2], or act as very local SETs or spectrometers.

In our most recent work [3], now accepted in Nature Communications, we found that such defects in hexagonal Boron Nitride form excellent sensors to nearby graphene. The defect-dot is a ‘minimally invasive’ probe – providing minimal screening and disruption, and should be useful in studying strongly interacting phenomena.

Required skills:

Nanofabrication (preferably with vdW materials); Electronic transport measurements; Measurement electronics – advantage; A successful candidate would be expected to fabricate samples, carry out measurements, and advise students.

Position is available immediately (or whenever international travel commences).

[1] [Nature Communications 9, 598 \(2018\)](#)

[2] [Phys. Rev. Lett. 123, 217003 \(2019\).](#)

[3] <https://arxiv.org/abs/2006.09812>

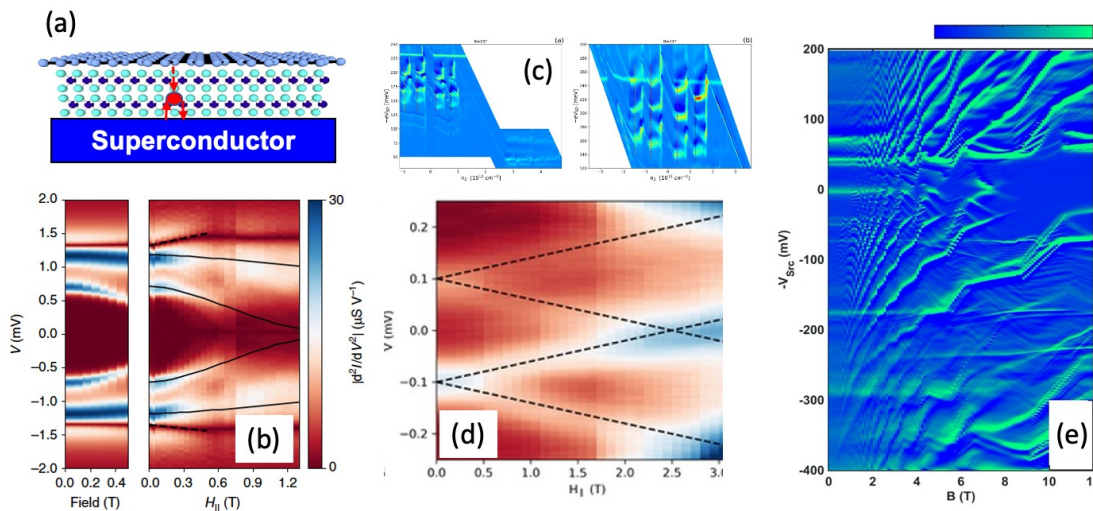
Contact: hadar@phys.huji.ac.il

Steinberg Lab Website:

<https://steinberglab.wixsite.com/steinberglab>

Racah Institute of Physics: <https://phys.huji.ac.il>

Hebrew University Website: <https://en.huji.ac.il/en>



(a) Generic tunneling device. Barrier defect is marked in red. Defect may undergo proximity, or serve as local spectrometer. (b) 2nd derivative of tunneling current [1], showing evolution of NbSe₂ two gaps vs. in-plane magnetic field. (c) Graphene spectrum vs. density at B = 20T, 33T. 4-fold degeneracy lifting shown [3]. (d) Andreev bound states associated with defect proximitized with NbSe₂ [2] (e) Landau fan measured by scanning the energy of a barrier defect [3].