



Solid State Institute
המכון למצב מוצק

TECHNION
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SEMINAR

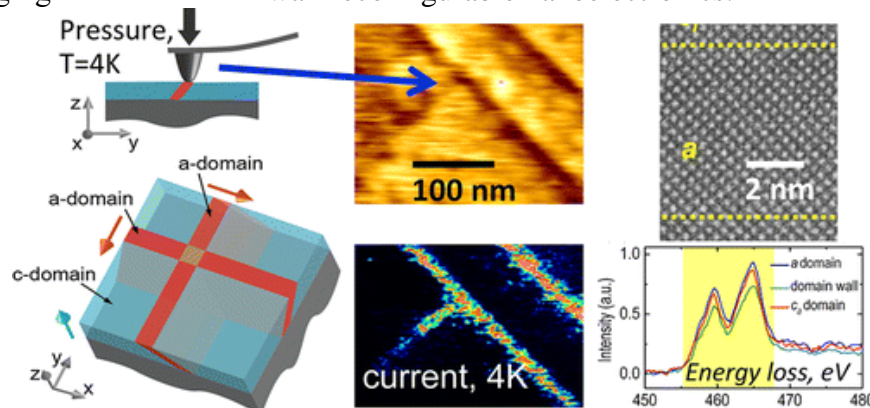
סמינר

Domain walls as mobile functional interfaces

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Ferroelectric domain-walls are interfaces that separate between regions, domains, inside the ferroelectric in which the spontaneous polarization is differently oriented. The thickness of domain-walls is typically 1-3 nm. Following recent advances in force and electron microscopy, we are investigating internal structure and properties of domain walls and their control. We identified several types of domain walls that are metallic conductors^{1,2,3,4} (inside the insulating material) and learnt how to create, eliminate and recreate them⁵ and control their density⁶. Ferroelectric boundaries were evidenced in non-ferroelectric materials⁷, whose displacement can be controlled by electric field gradient. In another direction, we elaborated ways to create patterns of ultra-high-density domain arrays with controlled domain-wall periodicity of 6-10 nm and showed their electrical erasure and recreation at room temperature.⁸ Domain wall propagation is directed and controlled⁹ and elastic interaction between non-ferroelastic domain walls is possible,¹⁰ thus adding 'building blocks' for the emerging field of domain-wall reconfigurable nanoelectronics.



1. T. Sluka et al., Nat. Comm. 3, (2012).
2. T. Sluka et al., Nat. Comm. 4, 2389 (2013).
3. I. Stolichnov et al. Nano Letters (2015).
4. P. Bednyakov et al. Sci. Reports 5, 15819 (2015).
5. A. Crassous et al. Nat. Nanotech. 10, 614 (2015).
6. L. Feigl et al., Nat. Comm. 5, 4677 (2014).
7. X.-K. Wei et al., Nat. Comm. 5, 3031 (2014).
8. M. Mtebwa et al, APL 107, 142903 (2015).
9. L. McGilly et al., Nat. Nanotech. 10, 145 (2015).
10. K. Shapovalov et al. PRL 113, 207601 (2014).

ההרצאה תתקיים ביום רביעי, ה-30.12.15 בשעה 12:30

בבניין המכון למצב מוצק, בחדר הסמינרים

The lecture will take place on Wednesday, 30.12.15 at 12:30

at the Solid State Institute, seminar room

Organizer: Associate Professor Oren Cohen

Host: Assistant Professor Yachin Ivry