

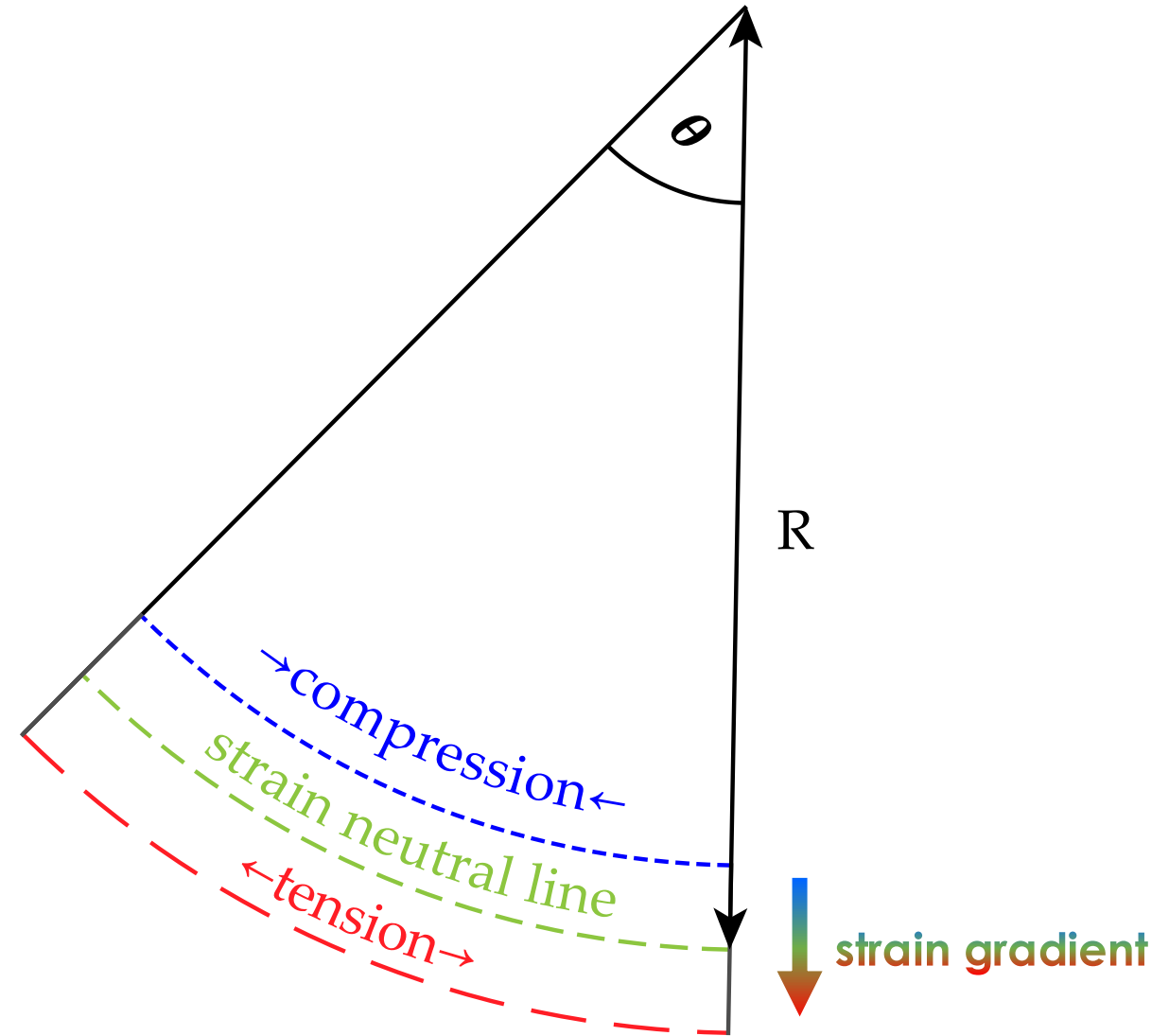
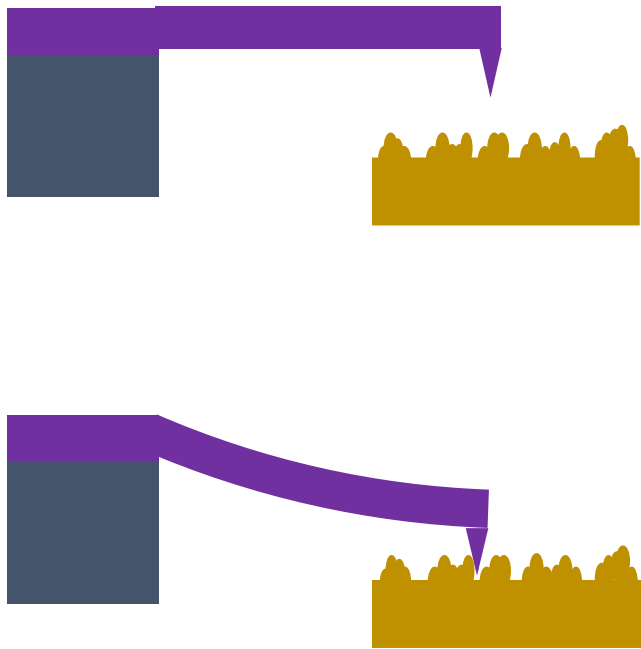
Flexoresistance: How to Bend Your Single Crystals

Sophie Rodehutsors

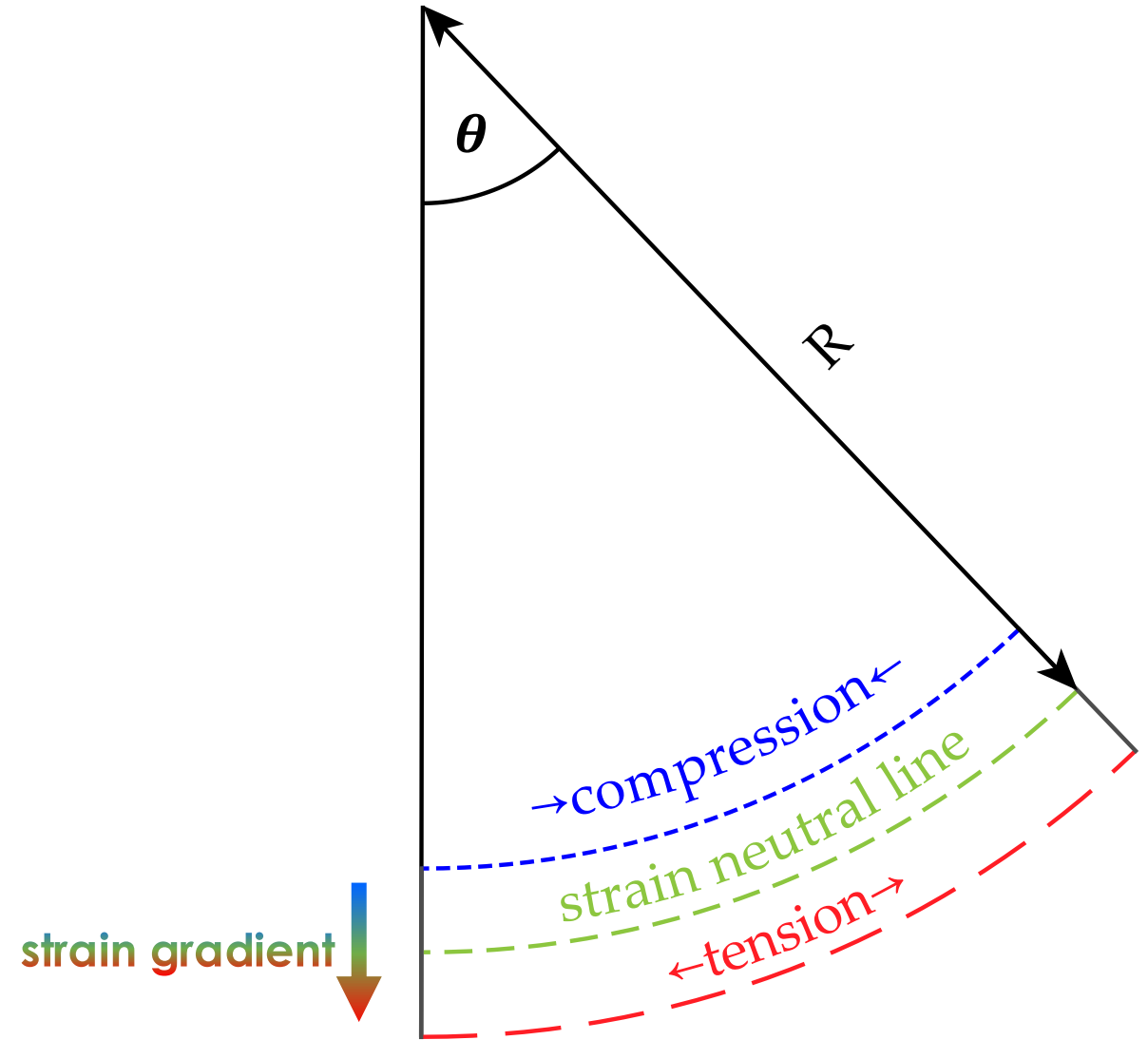
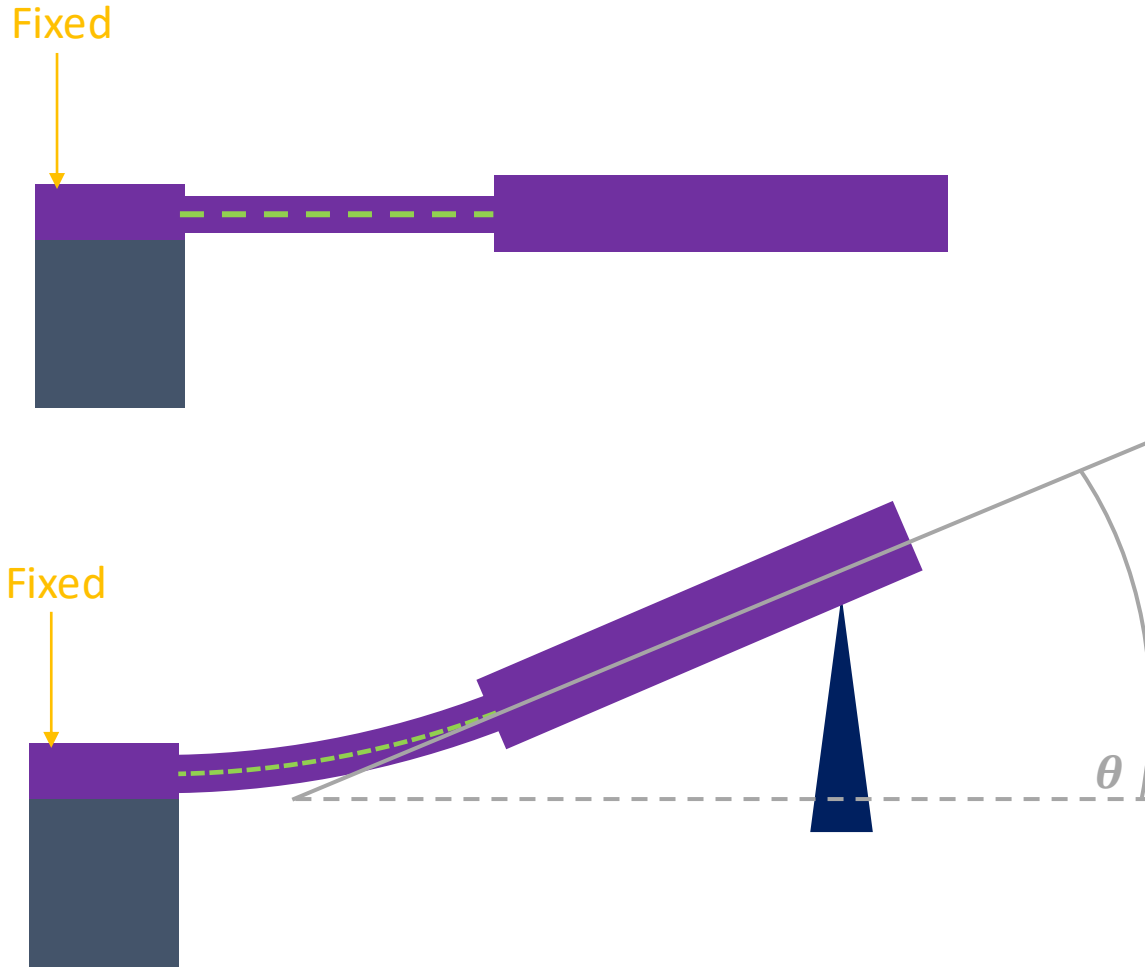
Elastically Driven Phases and Dynamics
in Quantum Materials

03.09.2026

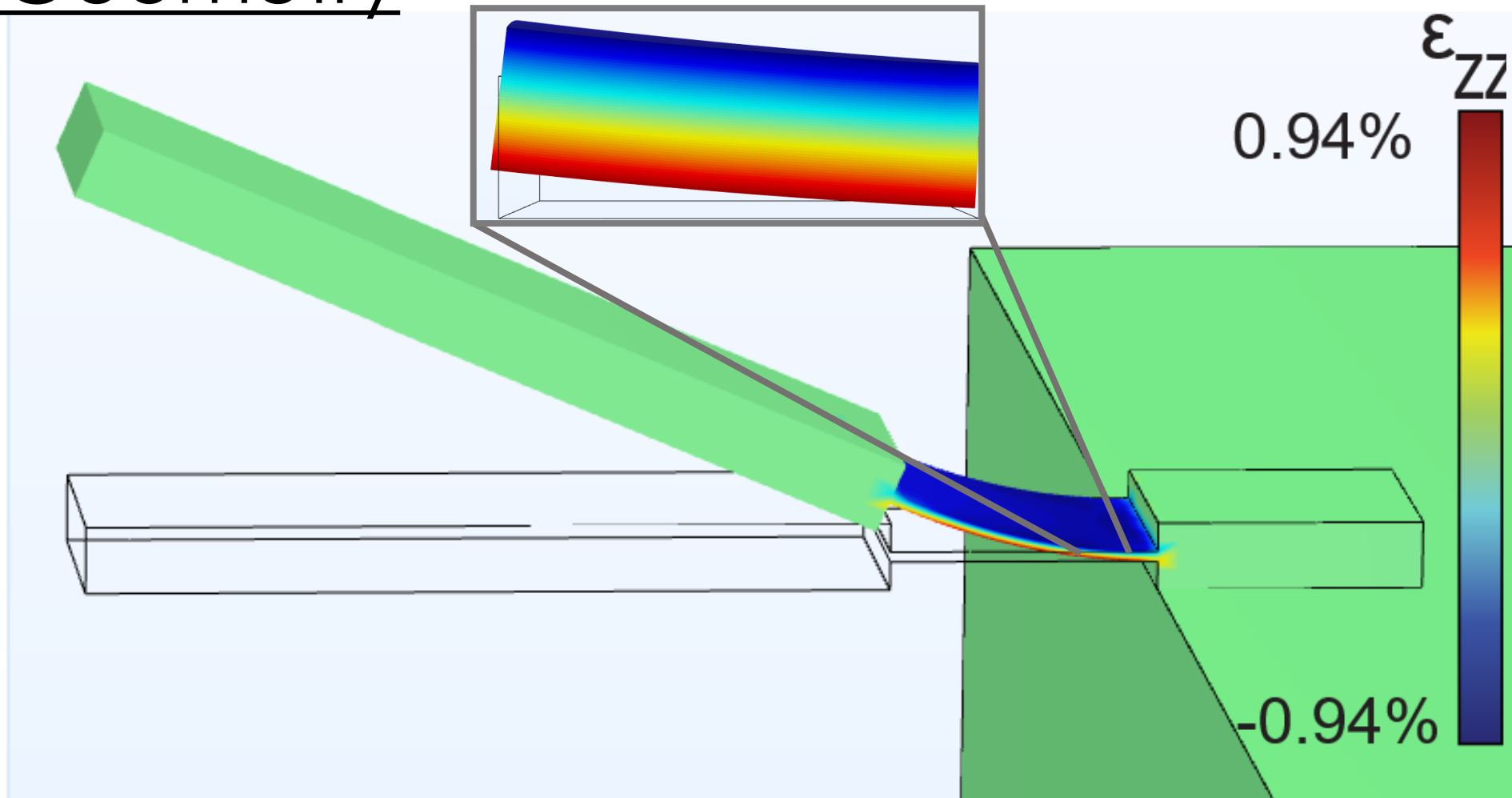
Strain Gradient through Bending



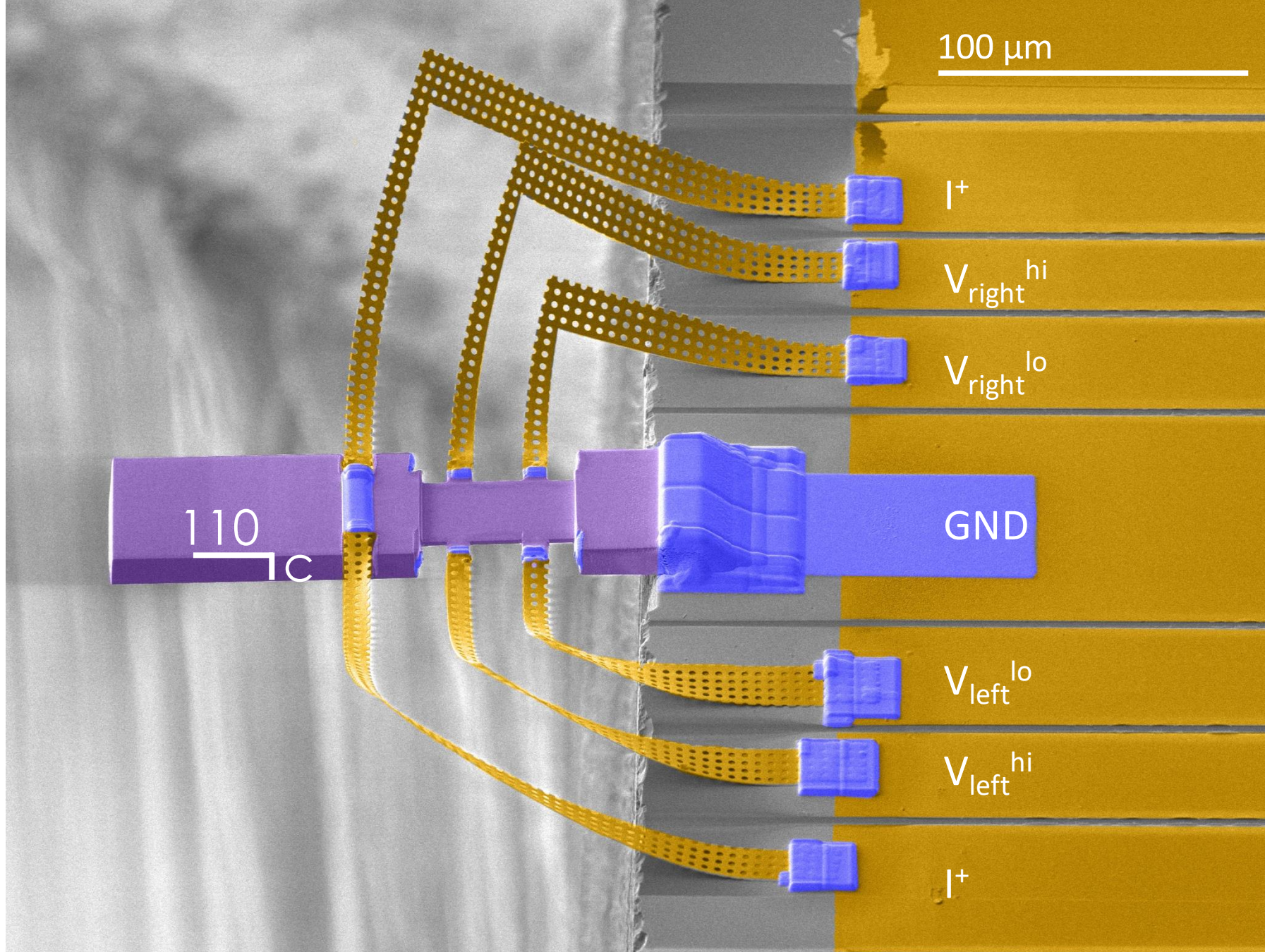
Strain Gradient through Bending

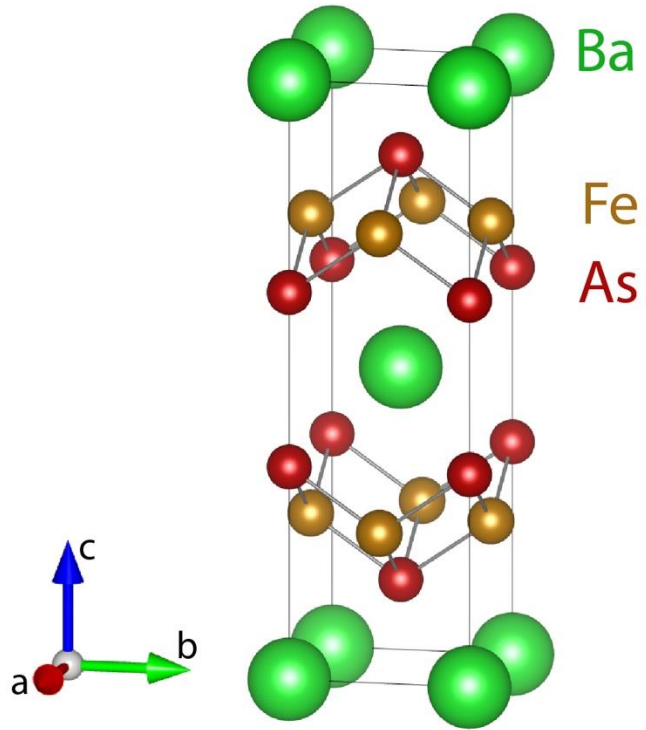
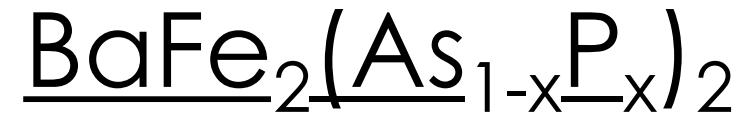
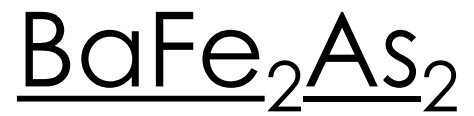


Devices and Geometry



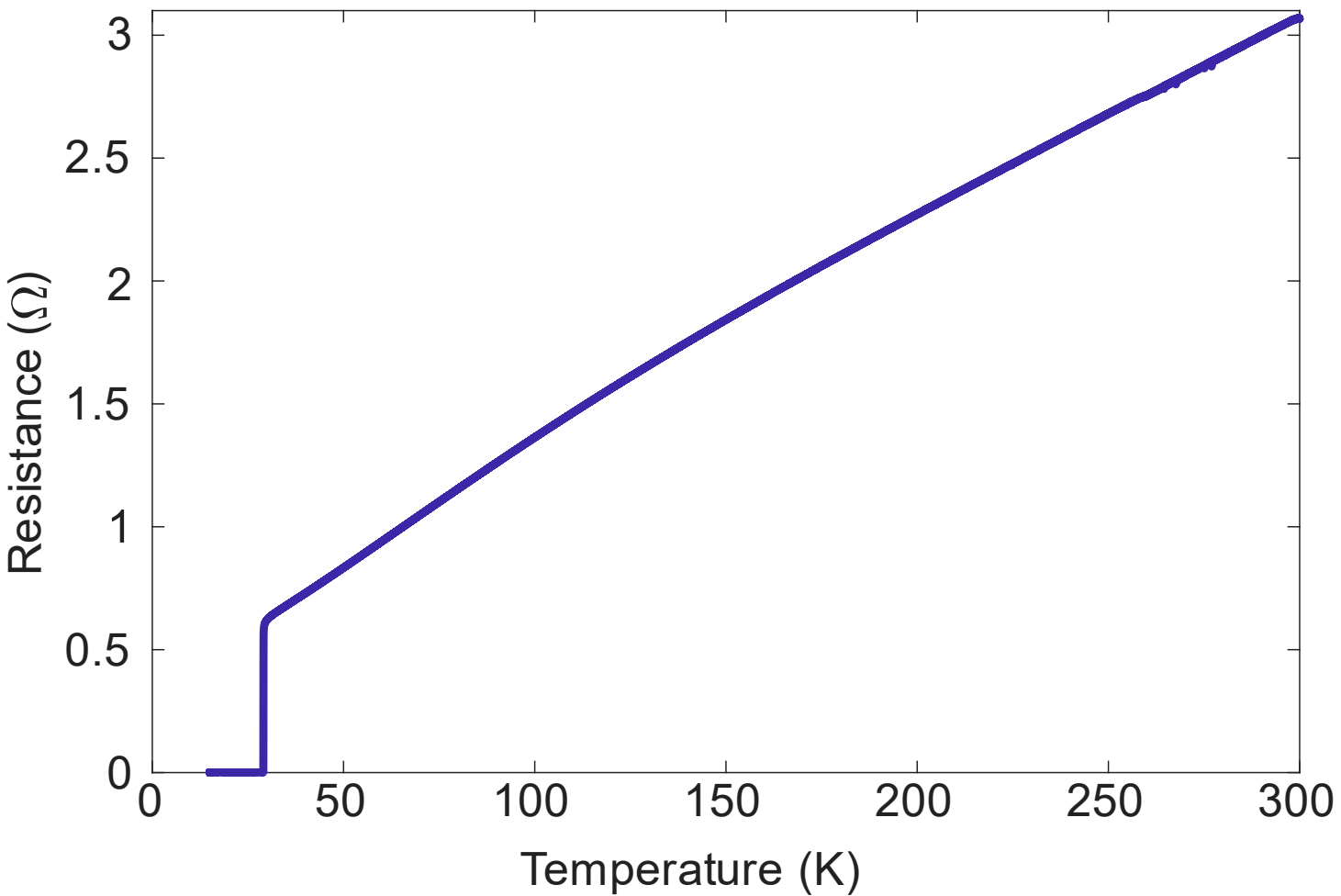
Membrane Contacted Bending Sample

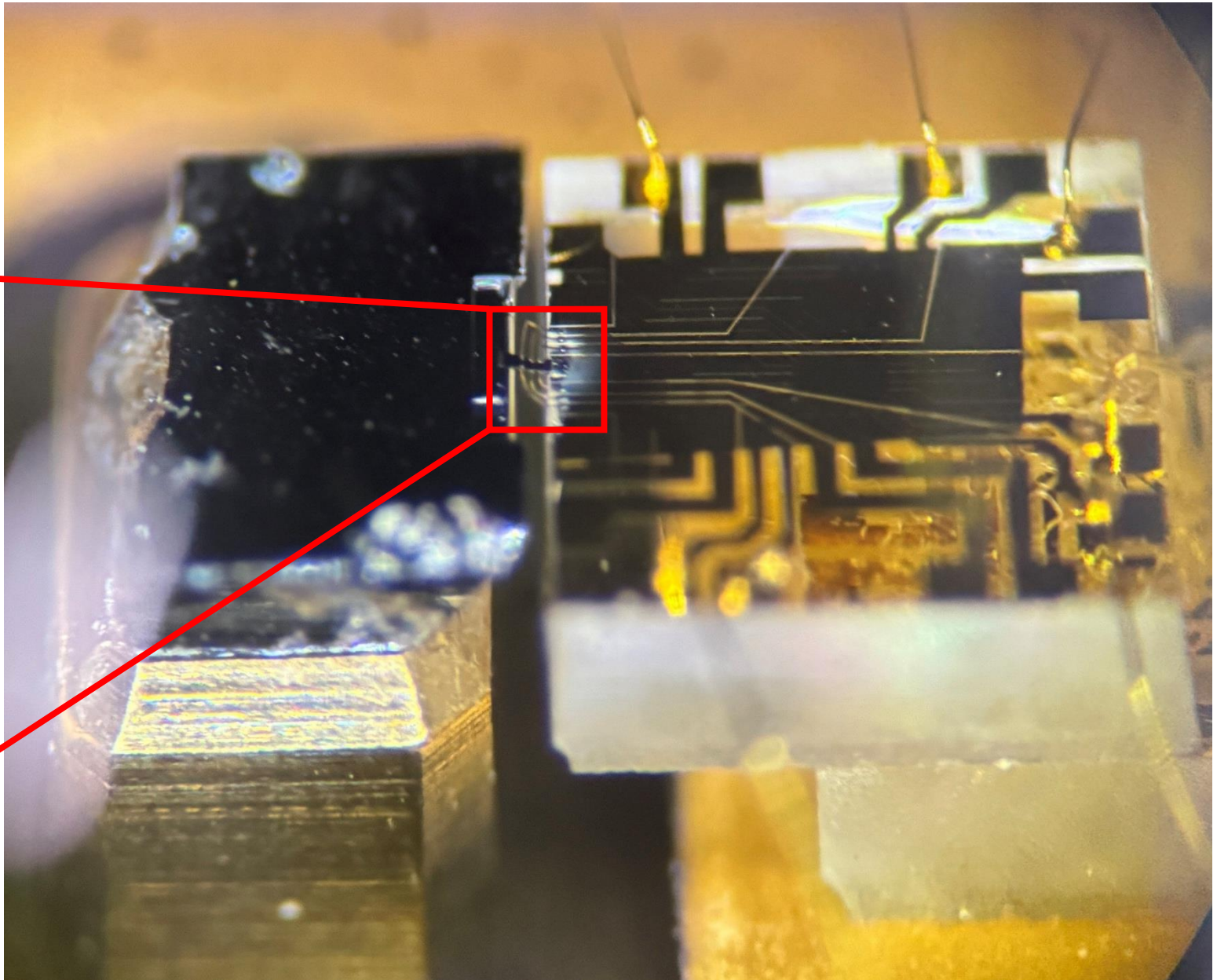
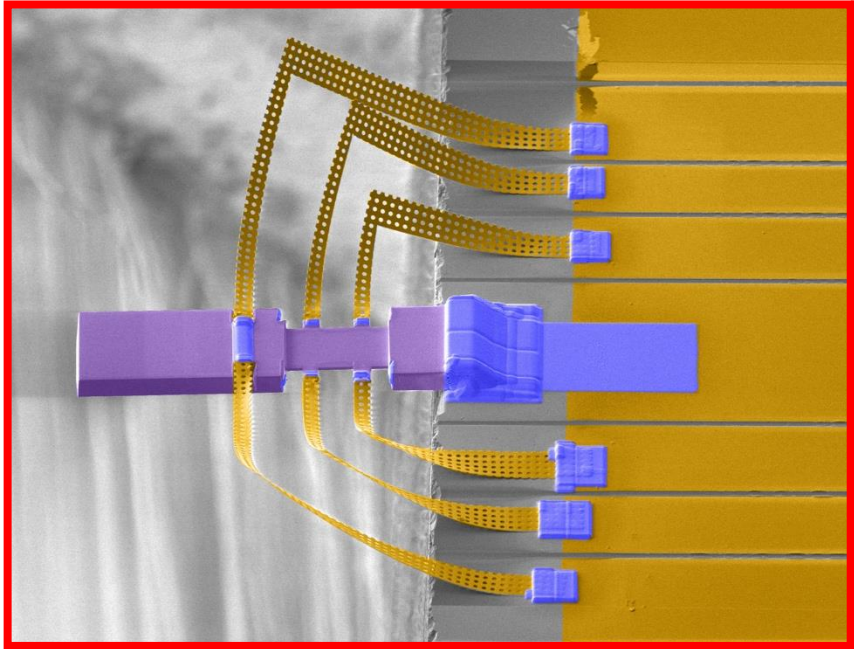




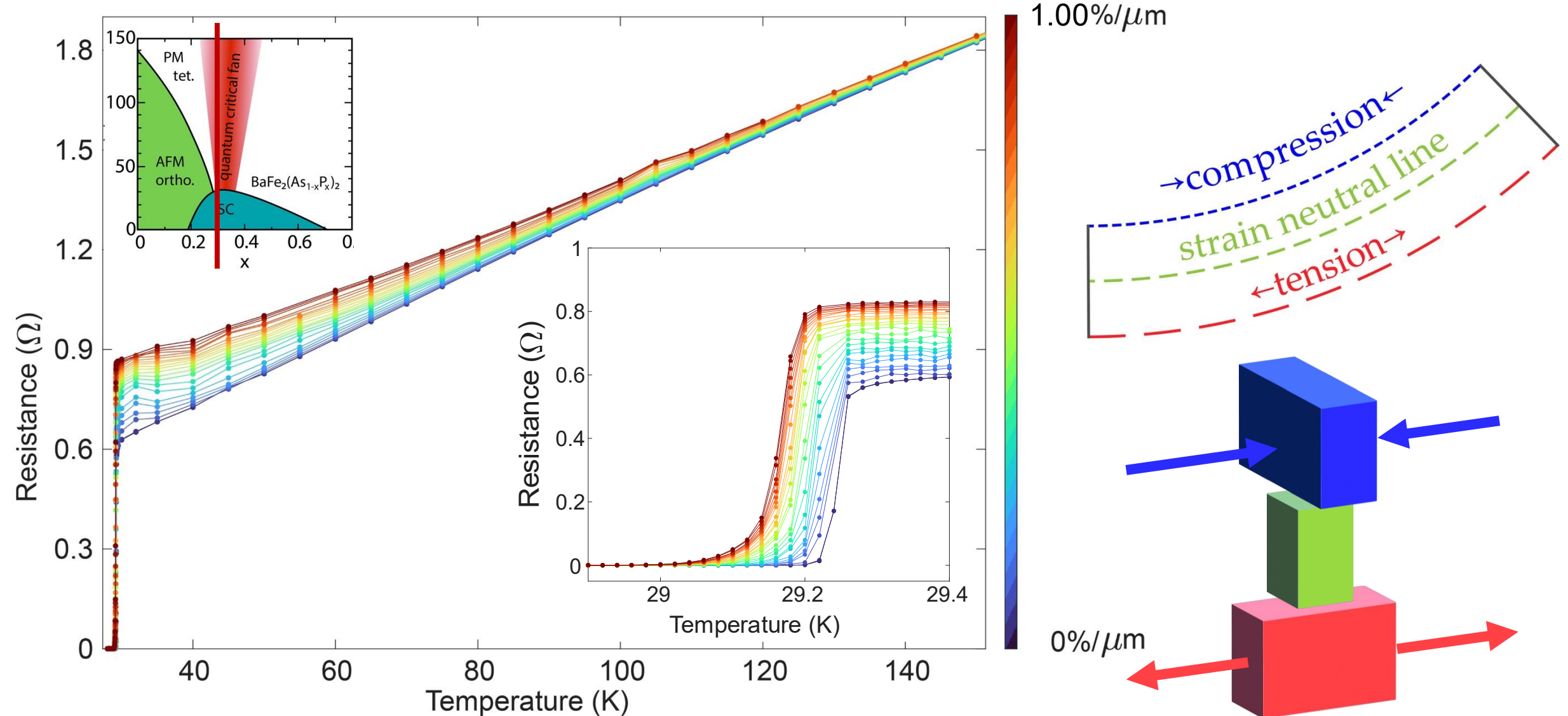
K. Momma et al. *J. Appl. Cryst.* **44**, 1272-1276 (2011)
 JE. Jørgensen et al. *Eur. Phys. J. B* **78**, 411-515 (2010)

Adapted from:
 Kasahara, S. et al. *Phys. Rev. B* **81**, 184519 (2010)





Flexoresistance of a Metal - $\text{BaFe}_2(\text{As}_{0.7}\text{P}_{0.3})_2$



Acknowledgements



mqm

mpsd



Theory:

Kaize Wang
Jörg Schmalian

Crystal Growth:

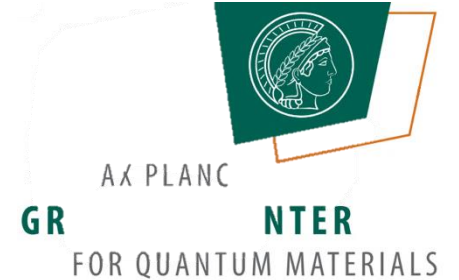
Augusto Ghiotto
James Analytis

Diffraction Experiments:

Tamme Wollweber
Alba Jumbo
Omkar Rambadey
Shen Zhou
Kartik Ayer
Sebastian Kalbfleisch

MQM:

Dorothee Hermann
Kaize Wang
Fabian Vetter
Djordje Gitaric
Brandon Torigino
Carsten Putzke
Philip Moll



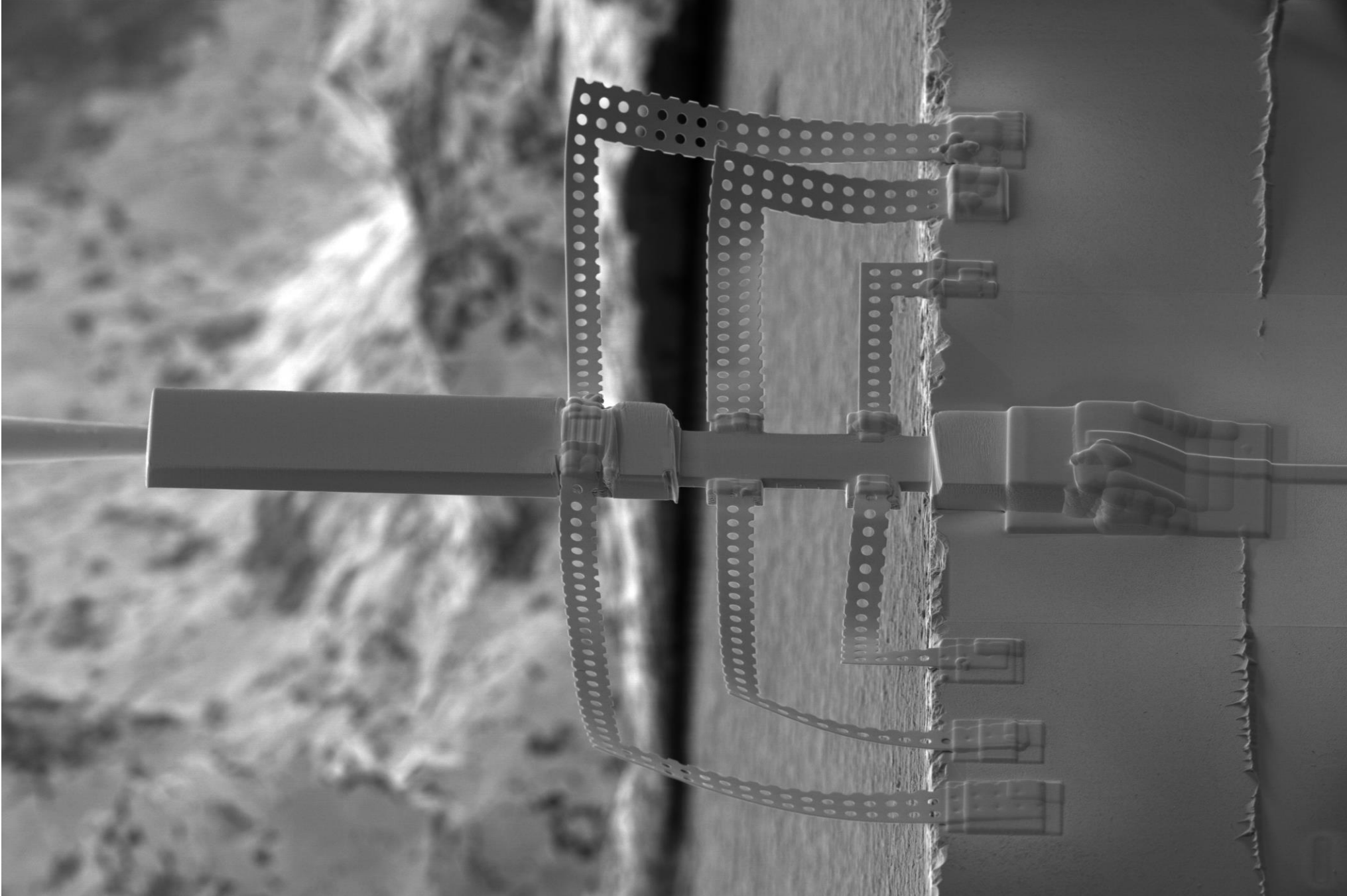
Funded by
the European Union



European Research Council
Established by the European Commission

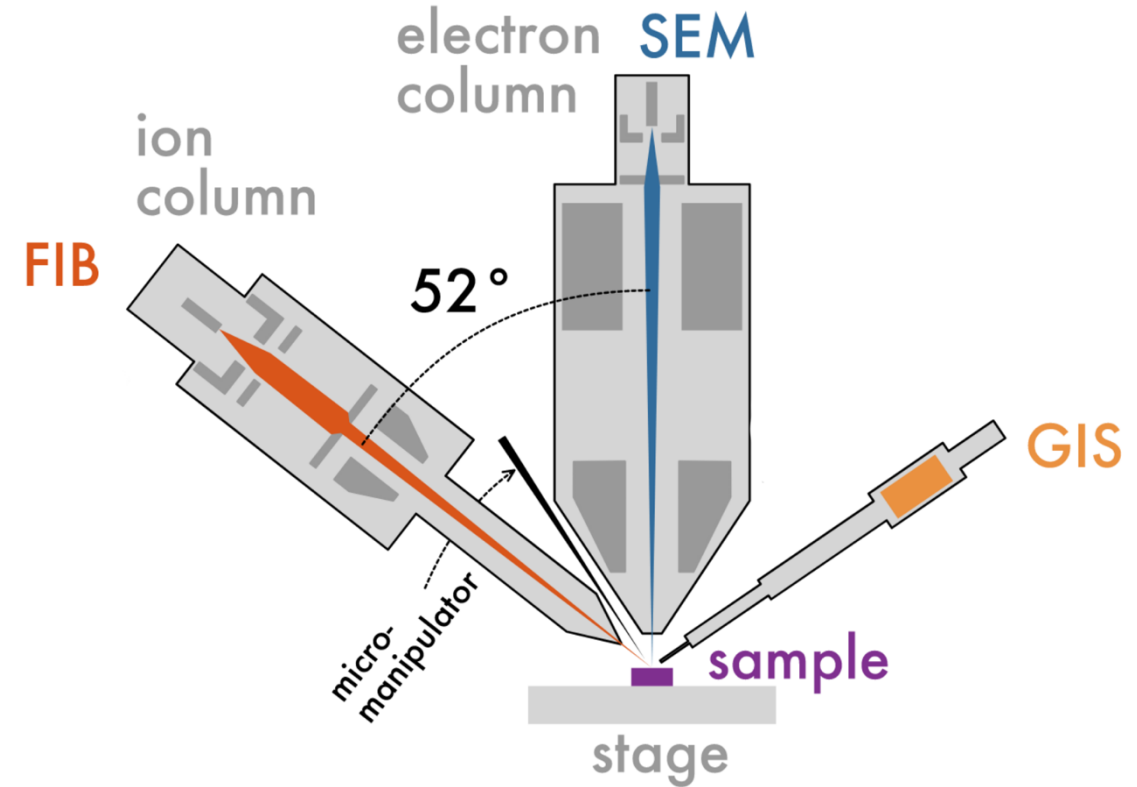
ERC grant XBEND, 101080740



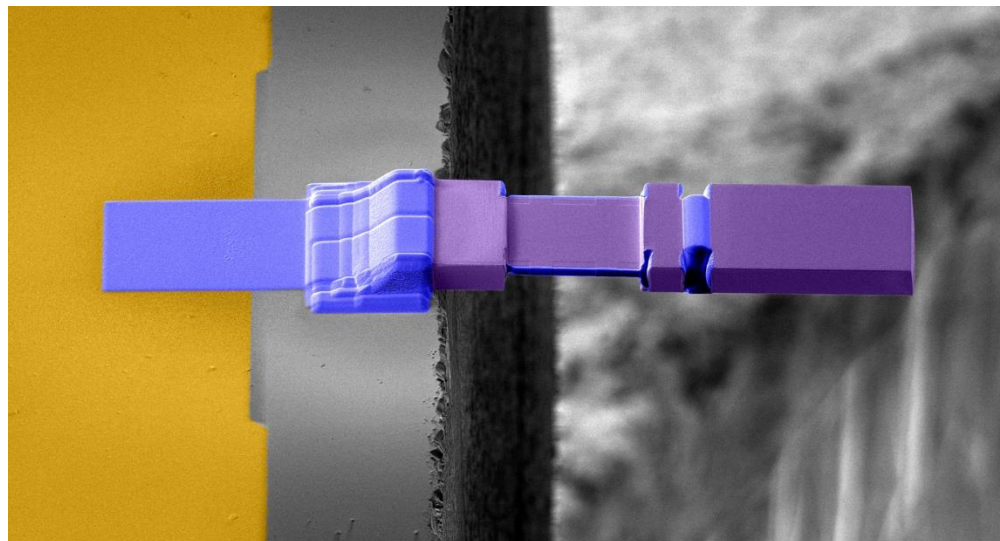
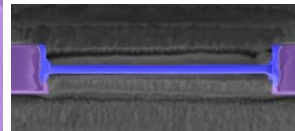
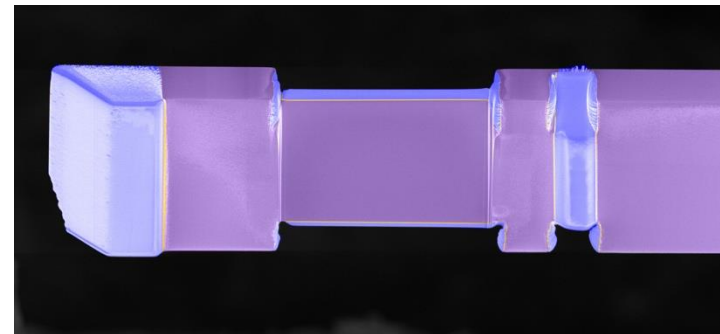
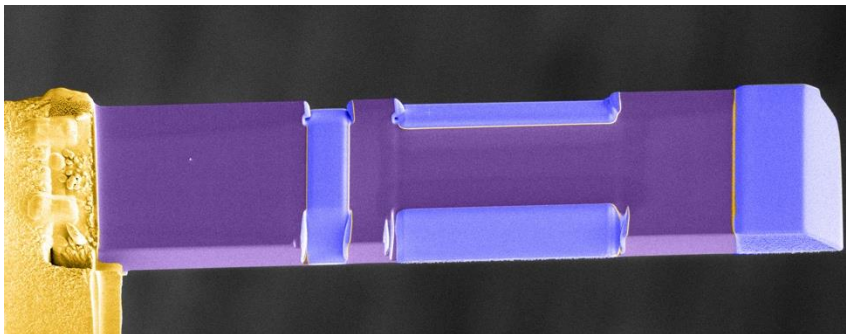
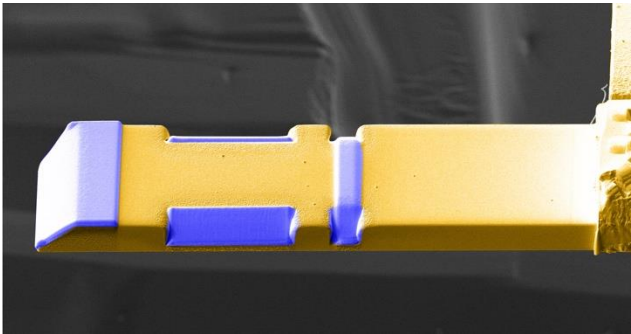
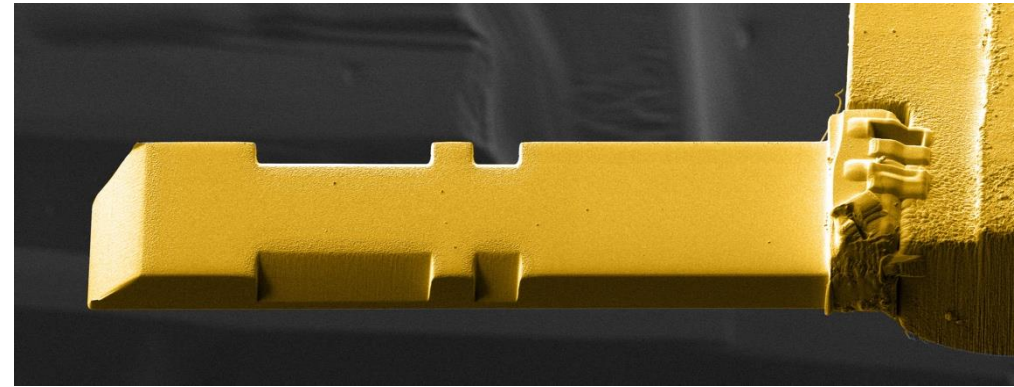
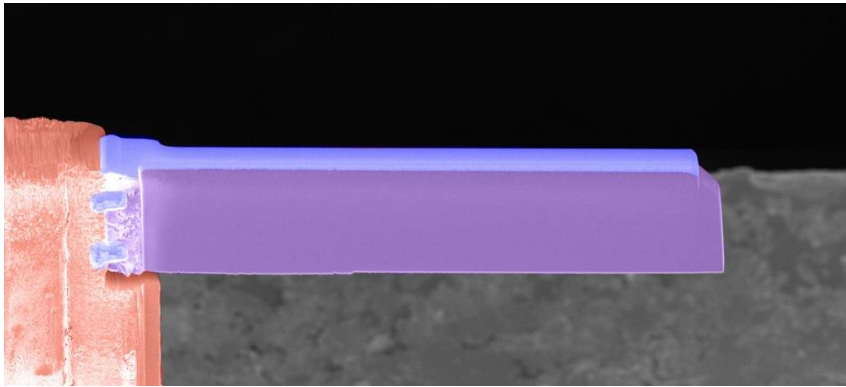


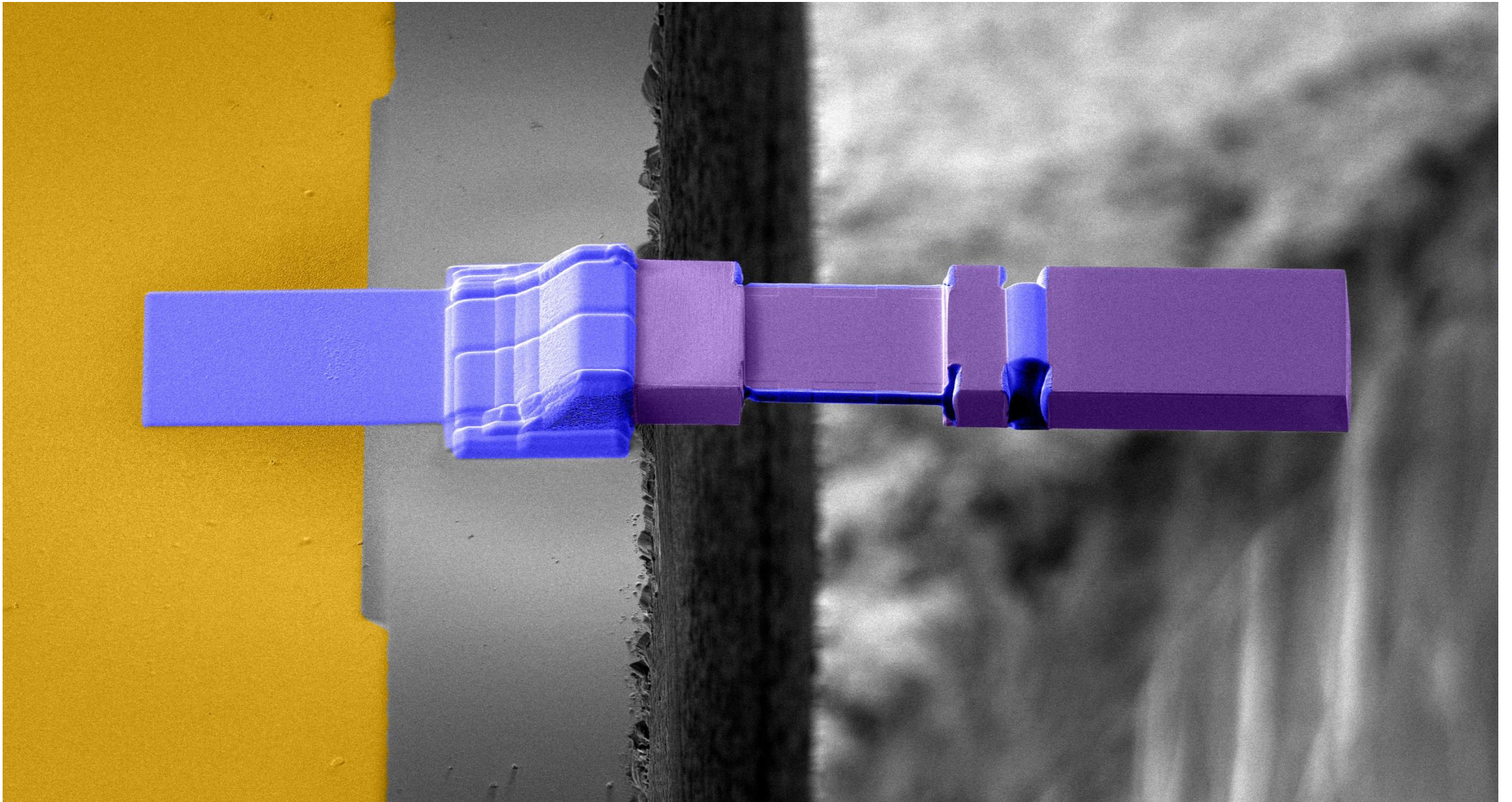
Focused Ion Beam Microstructuring

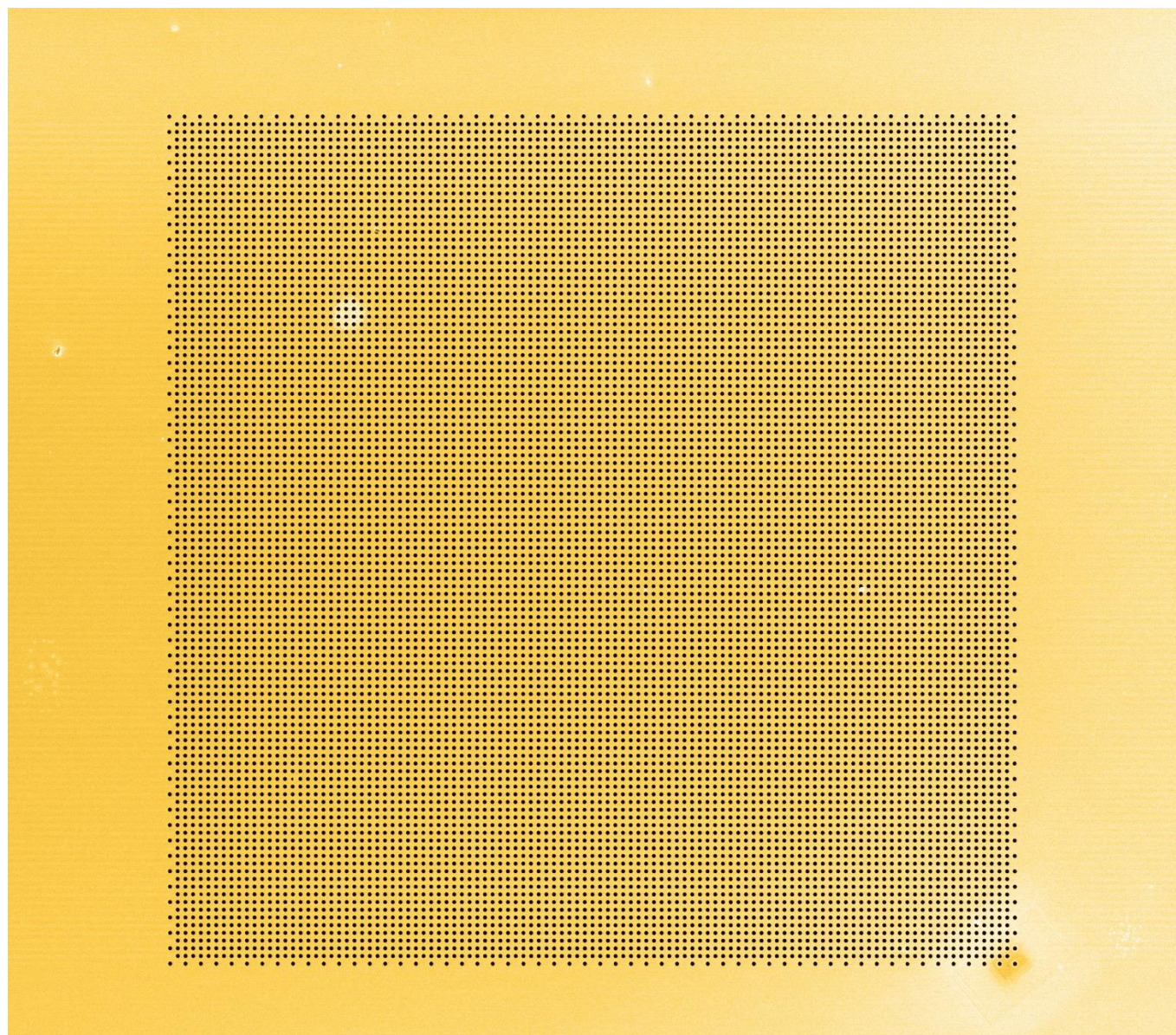
- Shape- and size-dependent effects in transport measurements
- In-situ milling, imaging, and deposition
 - material independent rapid prototyping
 - In any crystallographic orientation
 - Works even on non-exfoliatable materials, single crystals



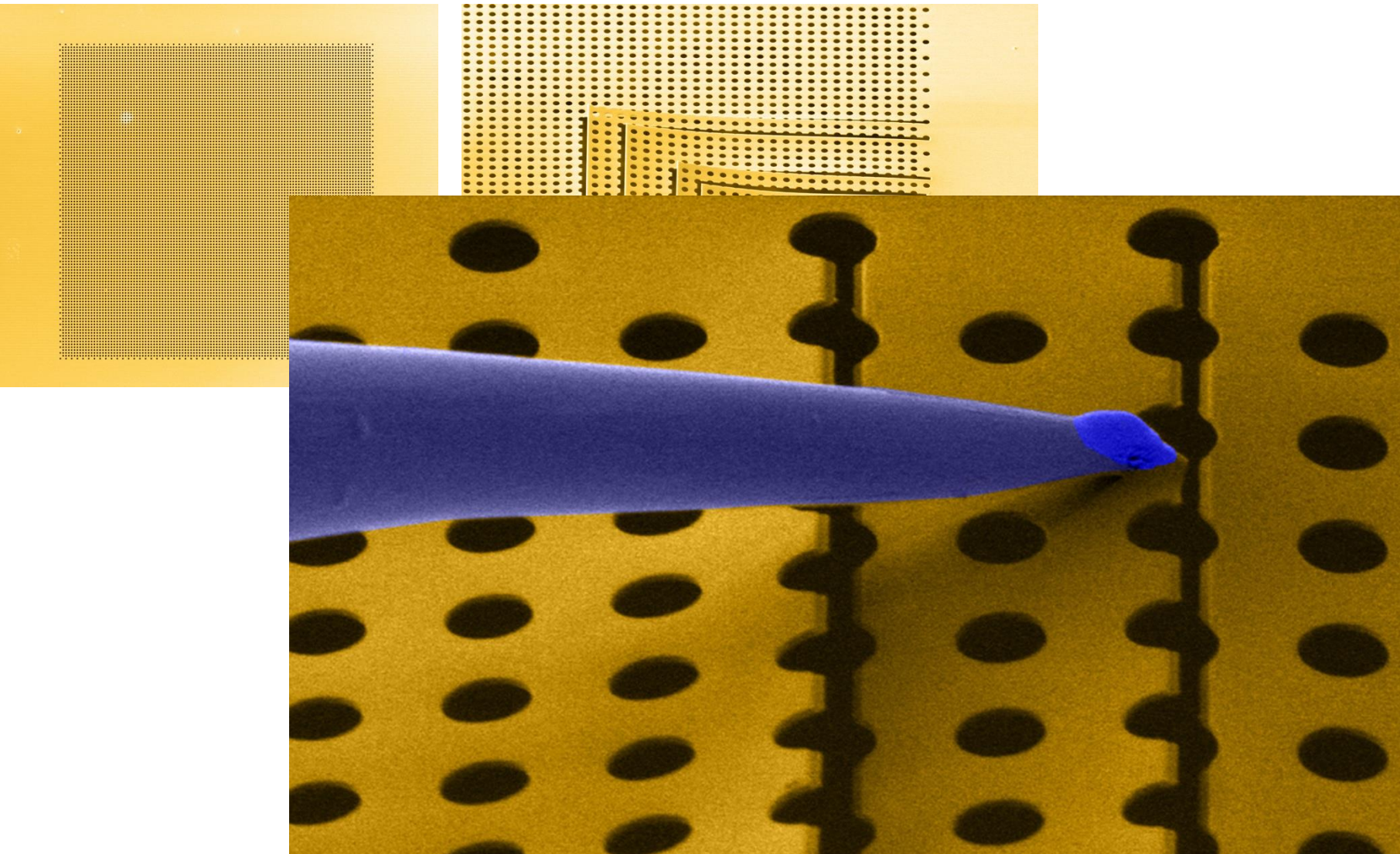
Adapted from M. Bachmann et al., *Springer Theses*, (2020)

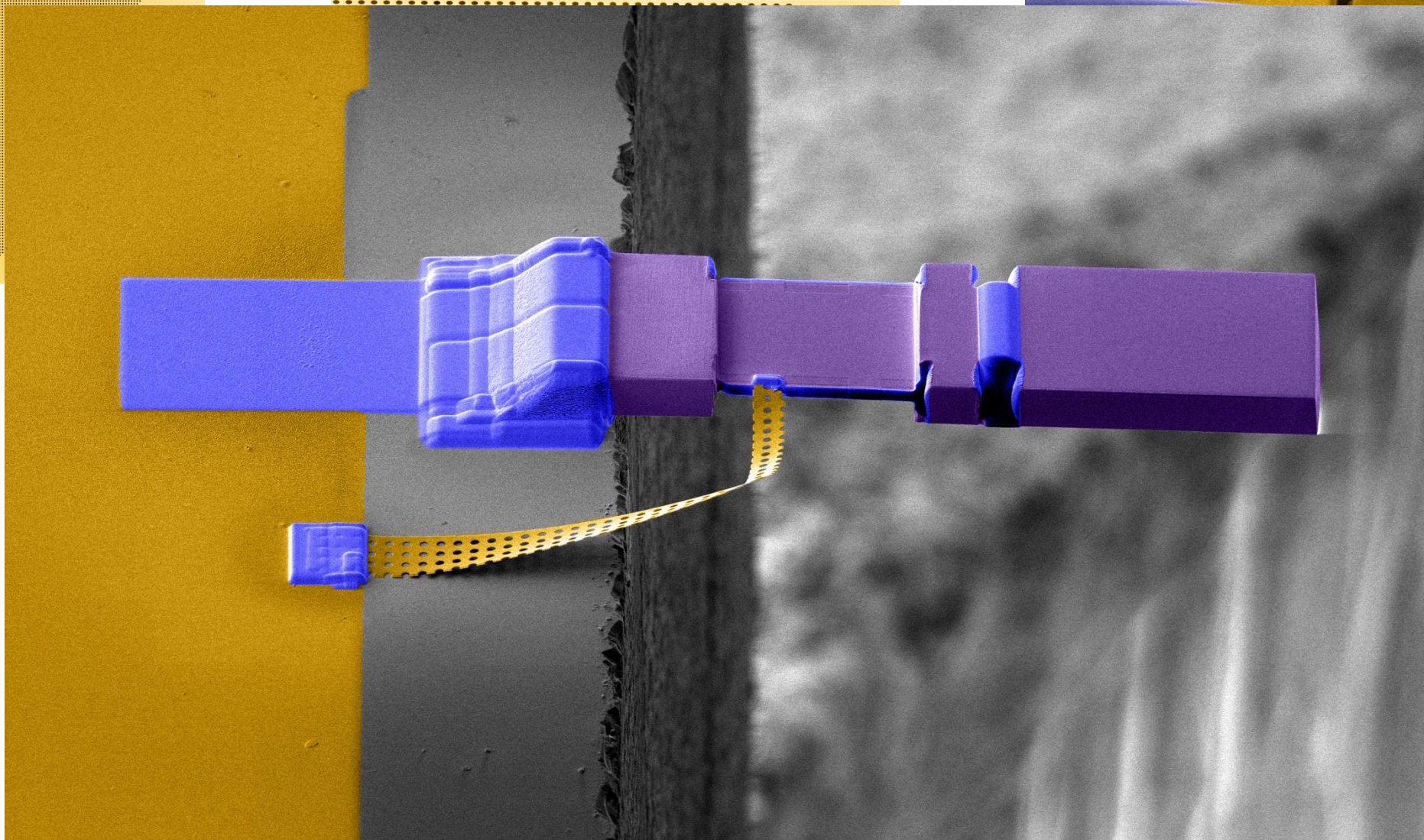










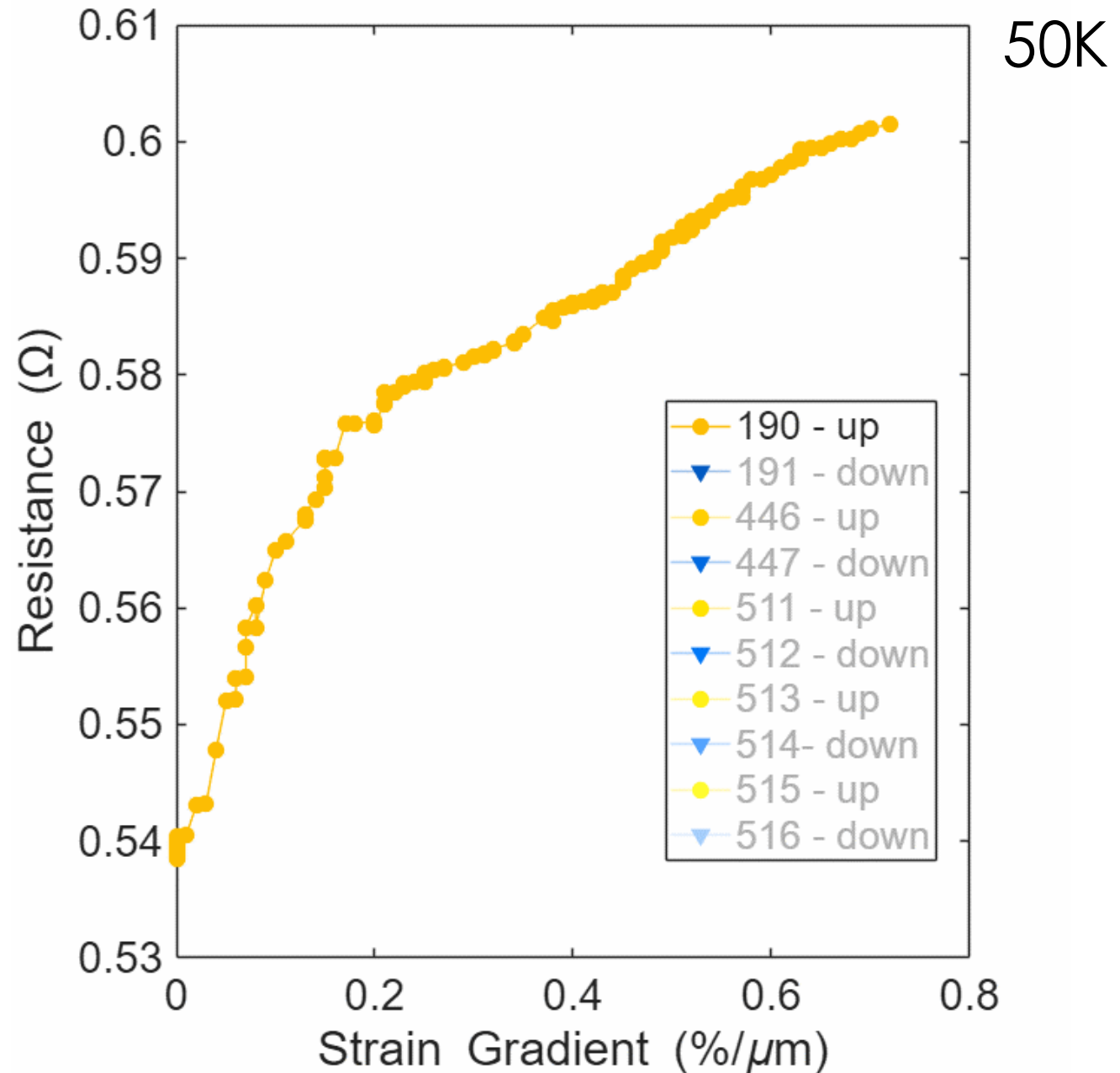
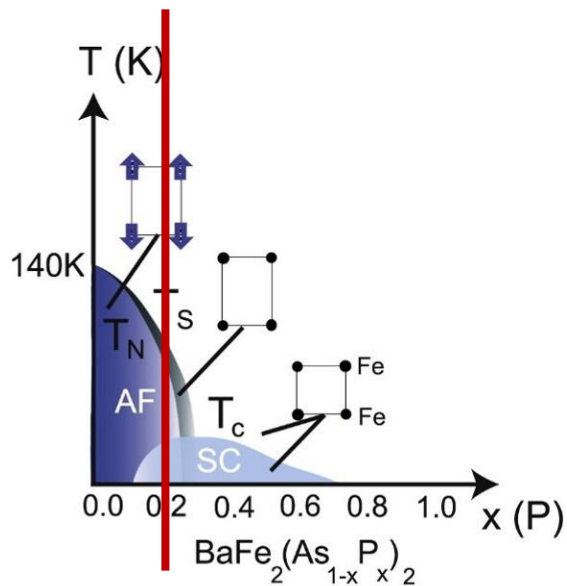


Reproducibility



$$T_s = 53 \text{ K}$$

$$T_c = 11 \text{ K}$$

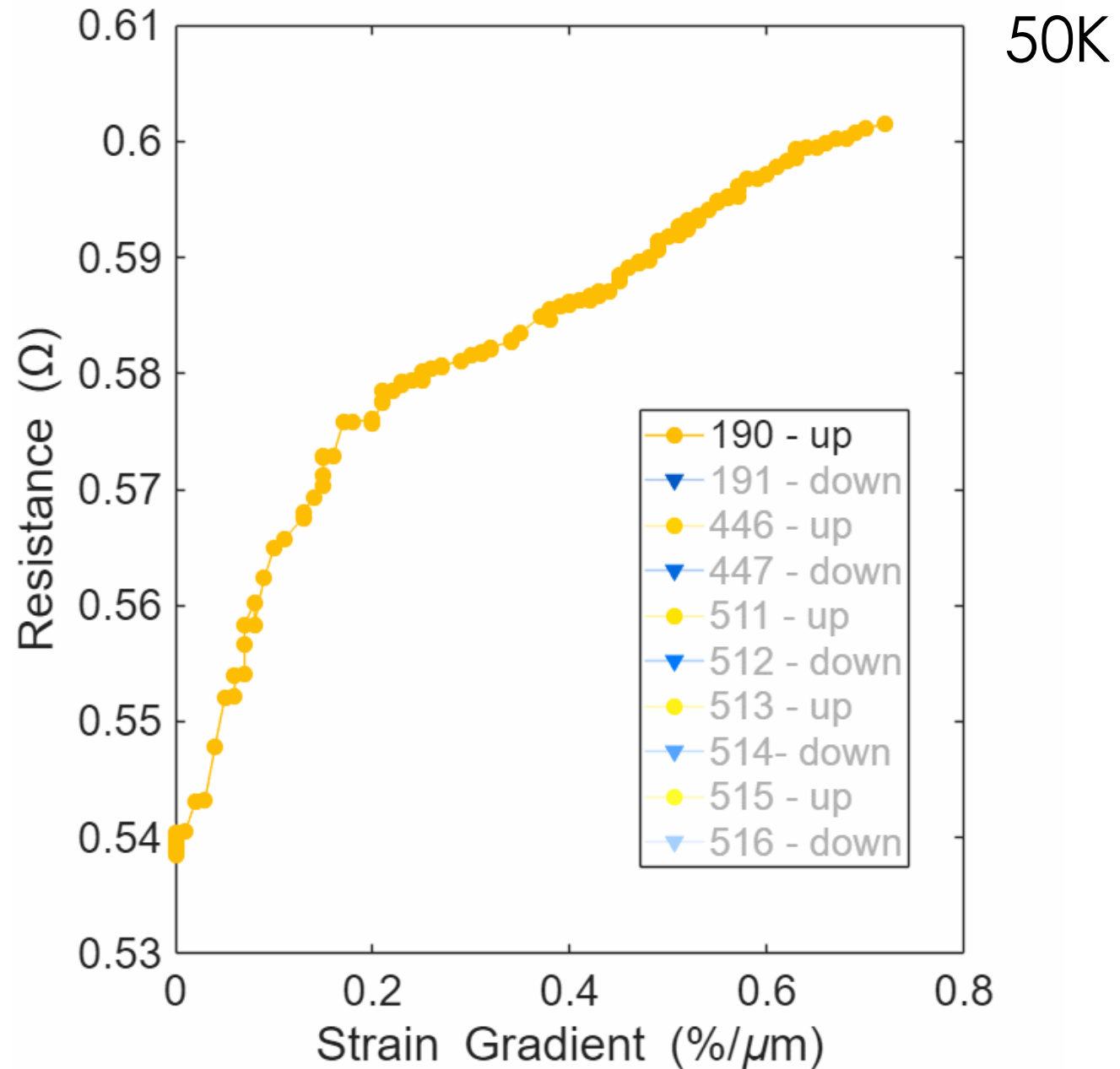


Reproducibility

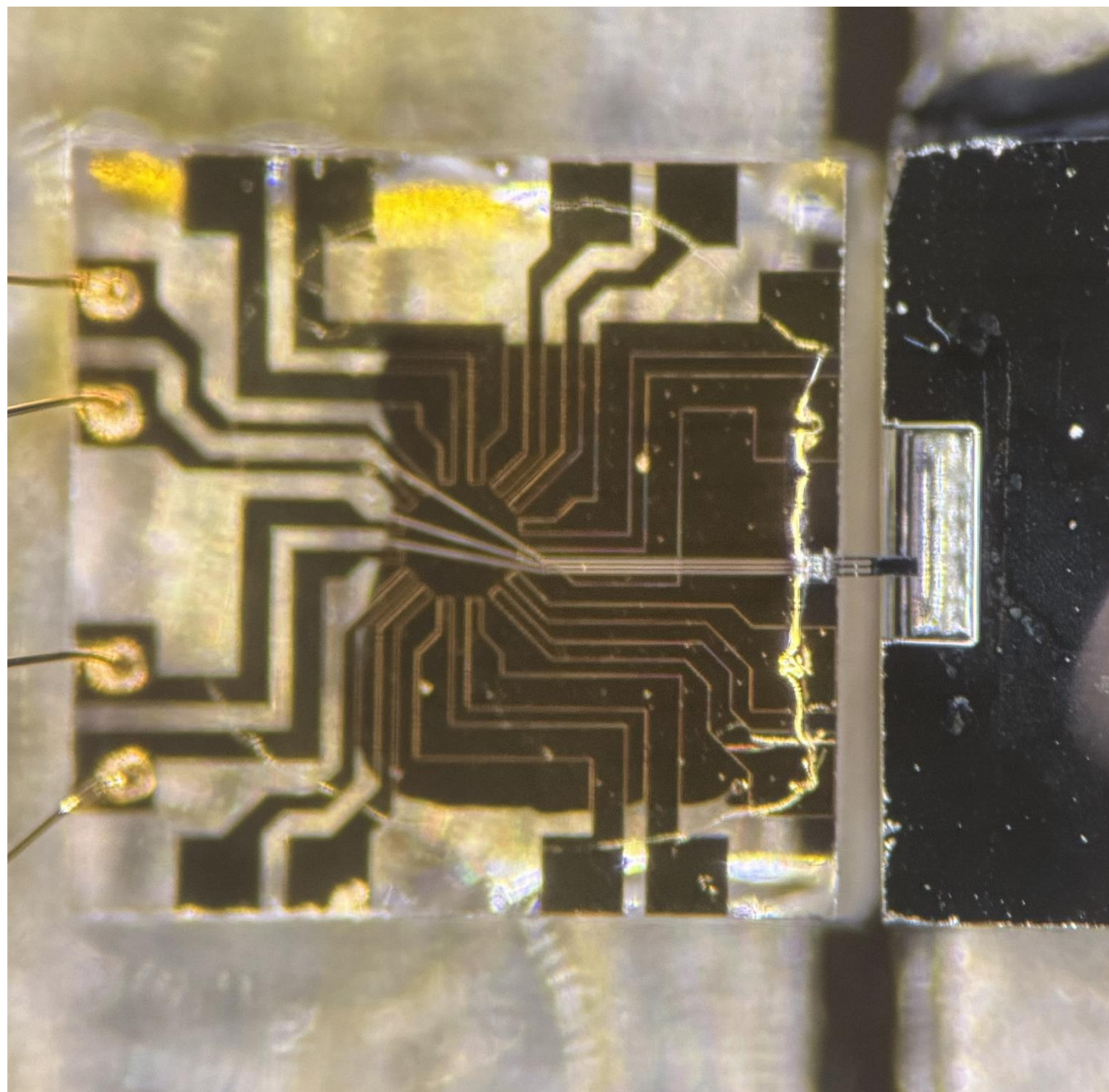


$$T_s = 53 \text{ K}$$

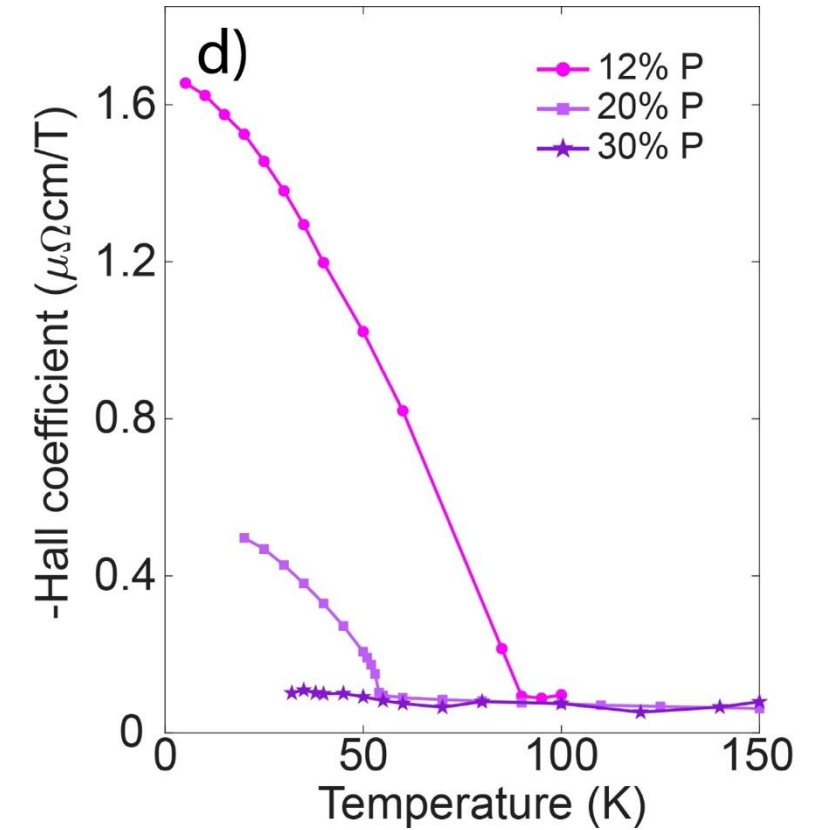
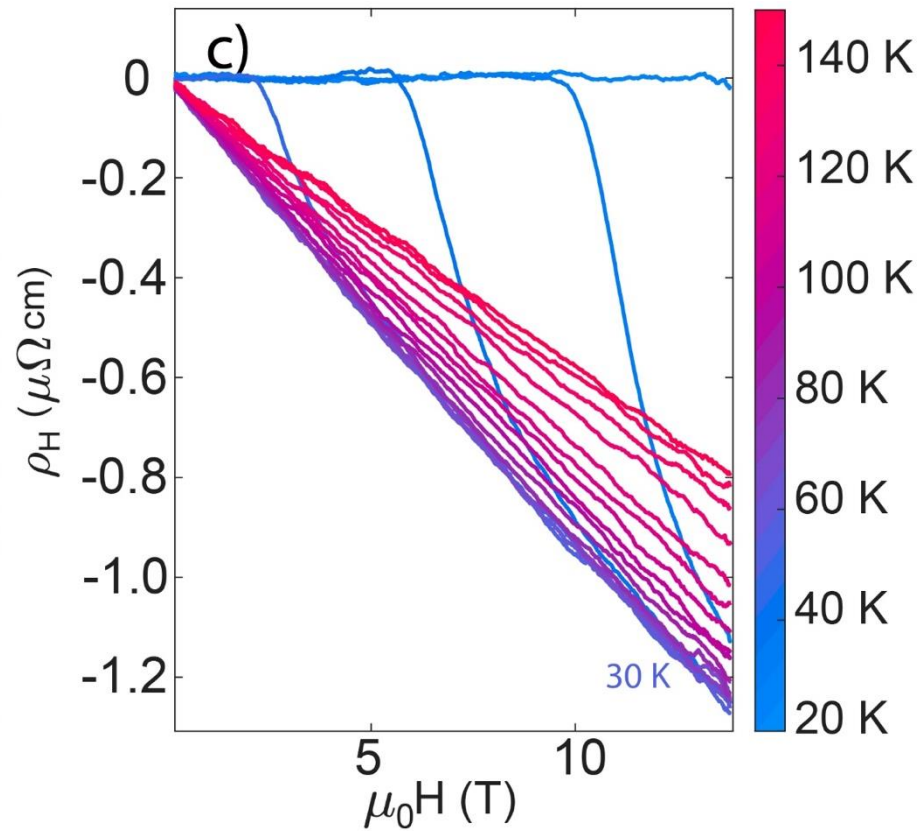
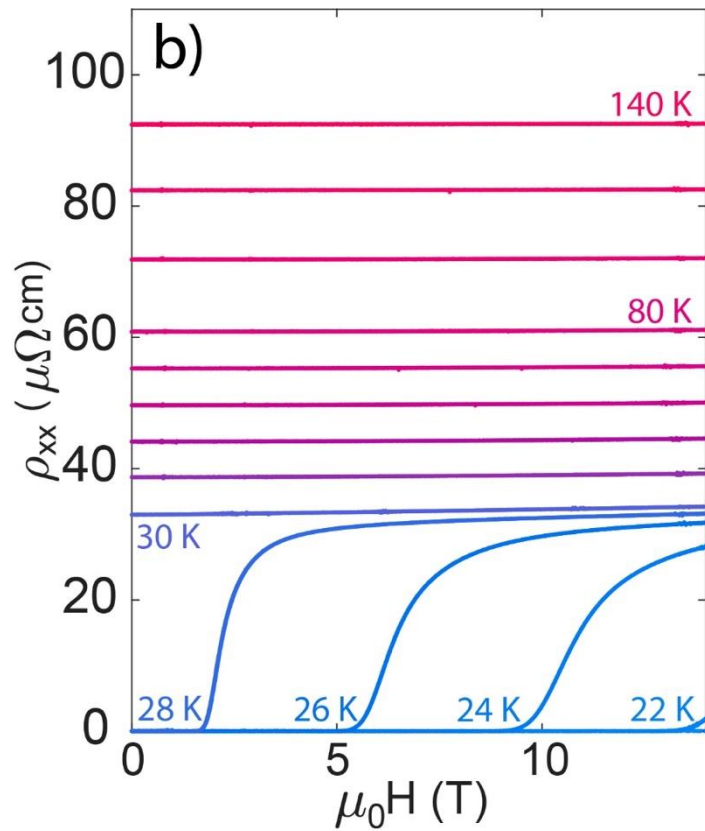
$$T_c = 11 \text{ K}$$



Bending

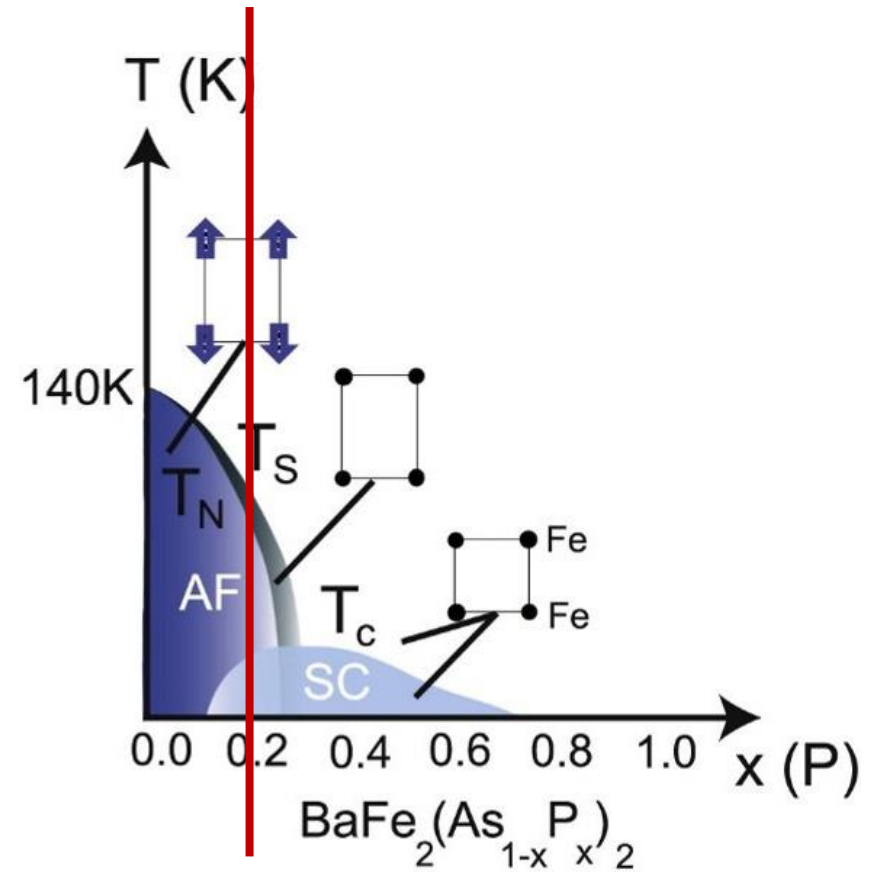
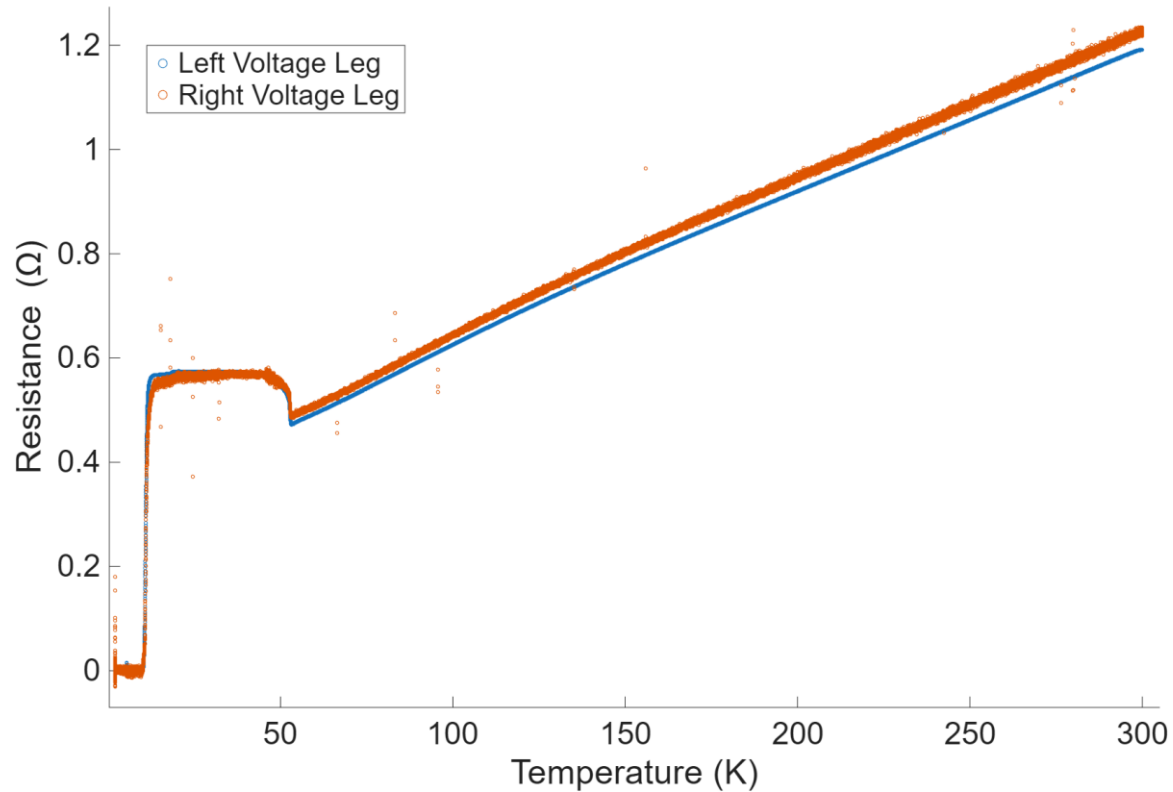


BaFe₂(As_{0.7}P_{0.3})₂

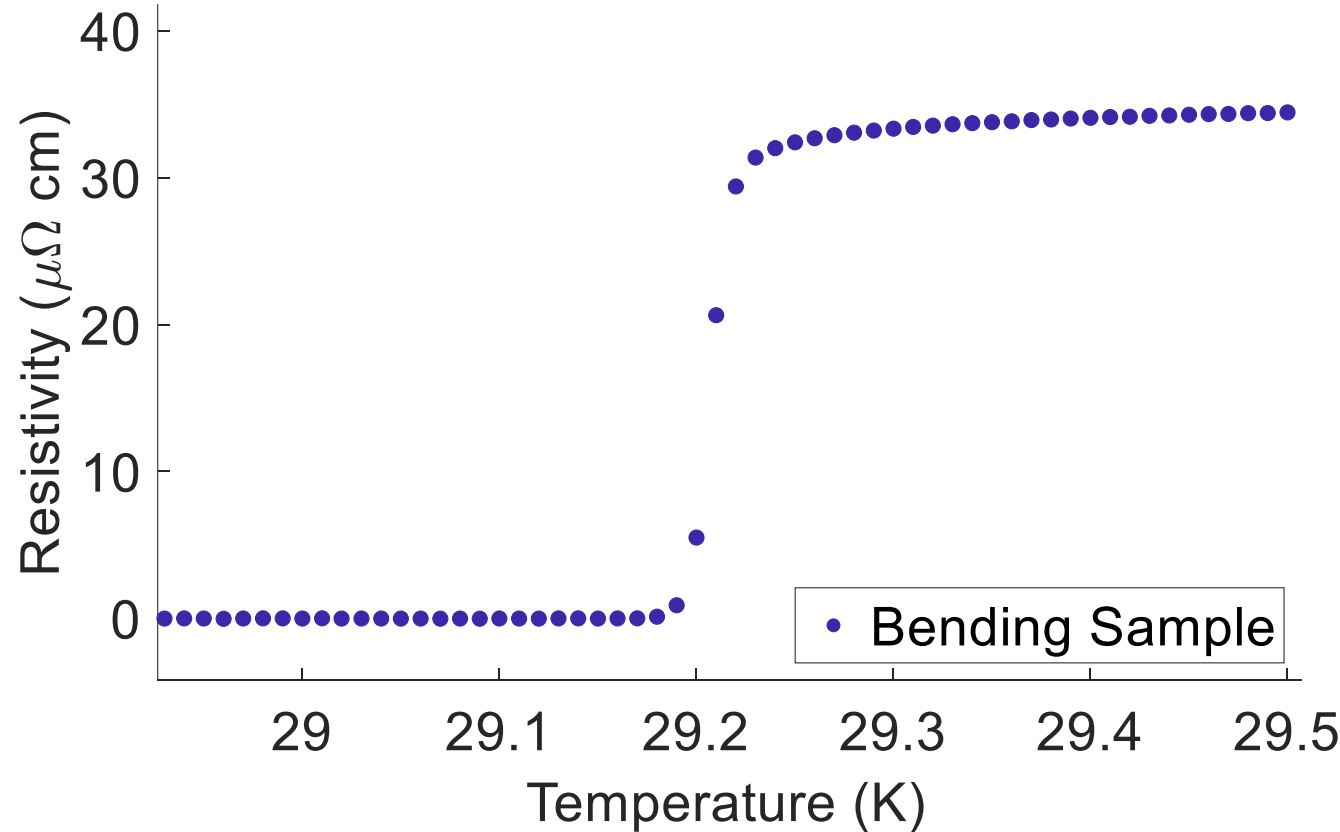
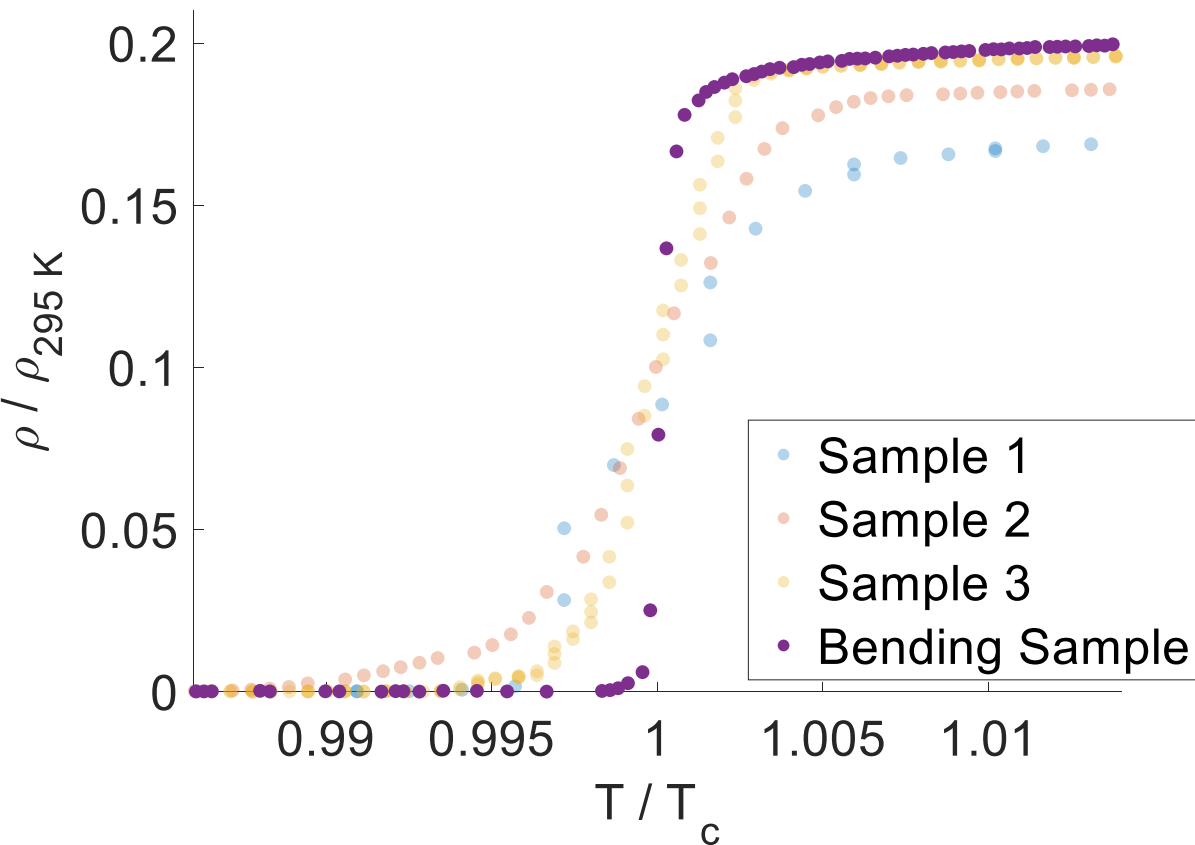




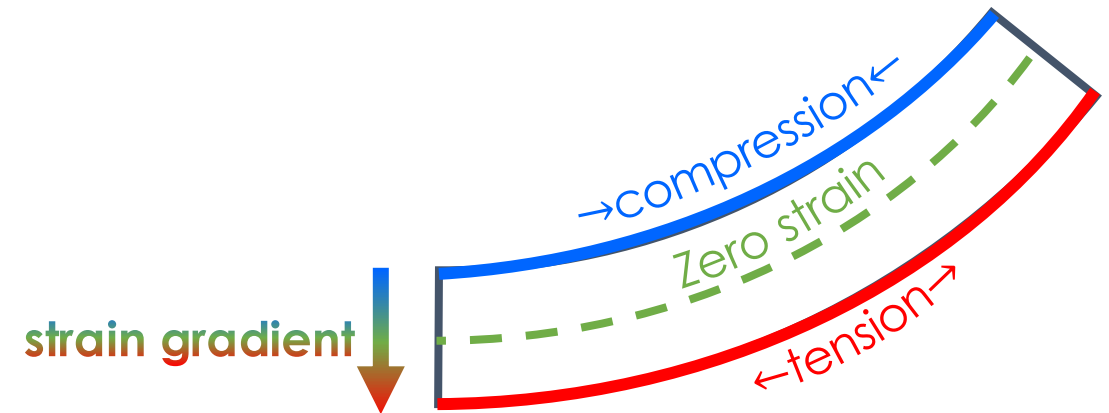
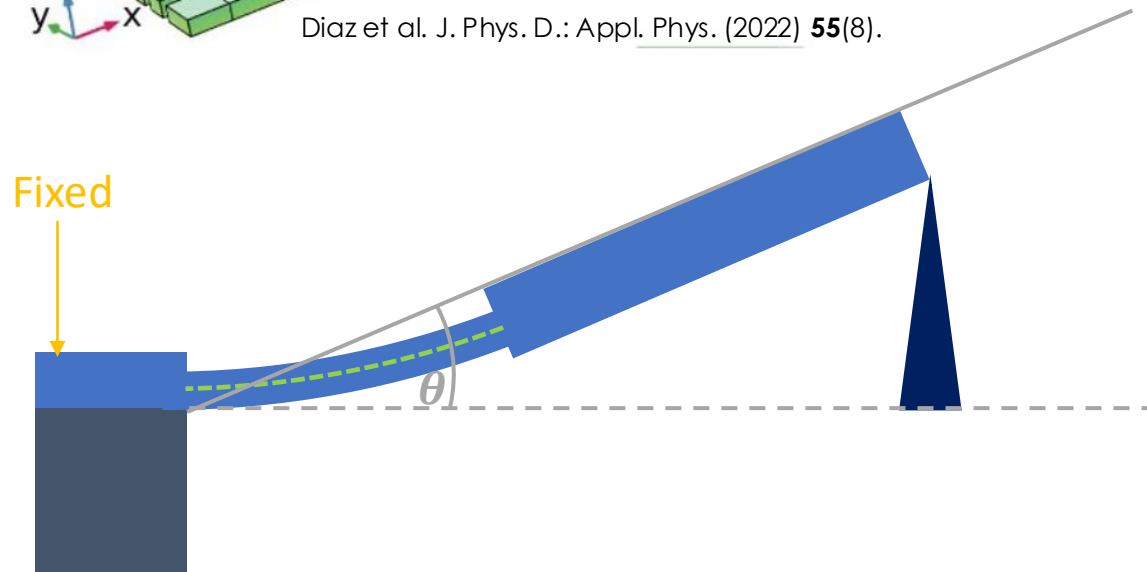
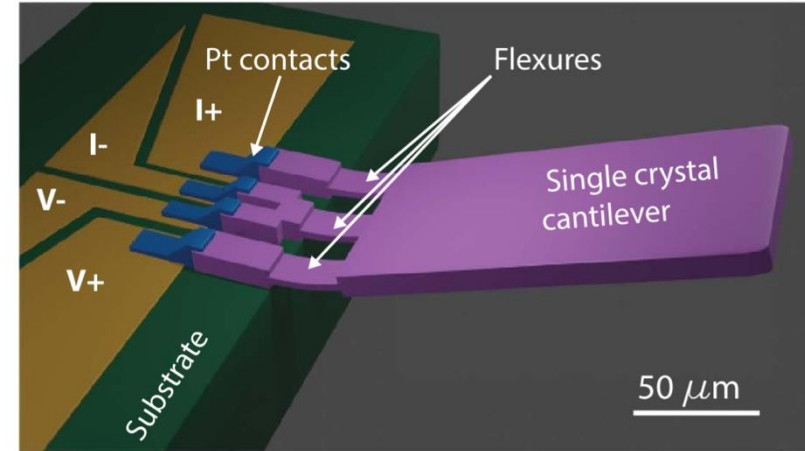
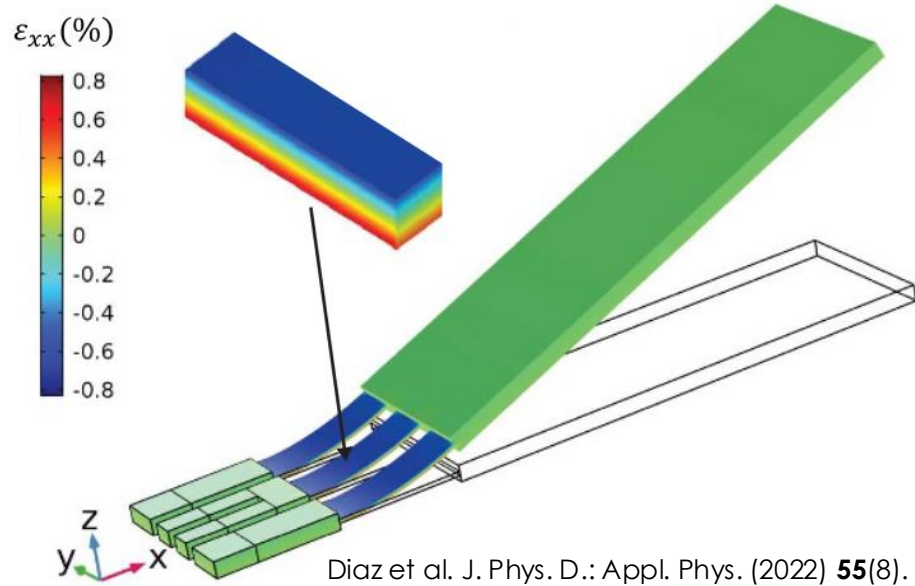
Cooldown at 0.5K/min



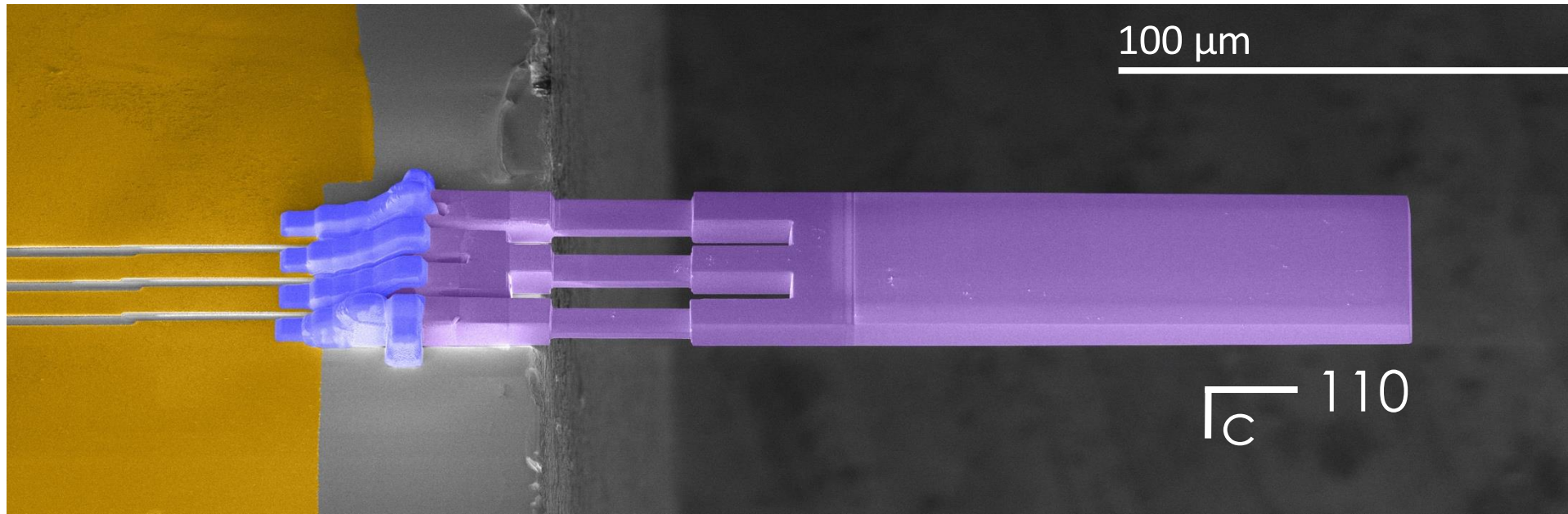
Sharpness of SC-transition, free-standing



Strain Gradient through Bending

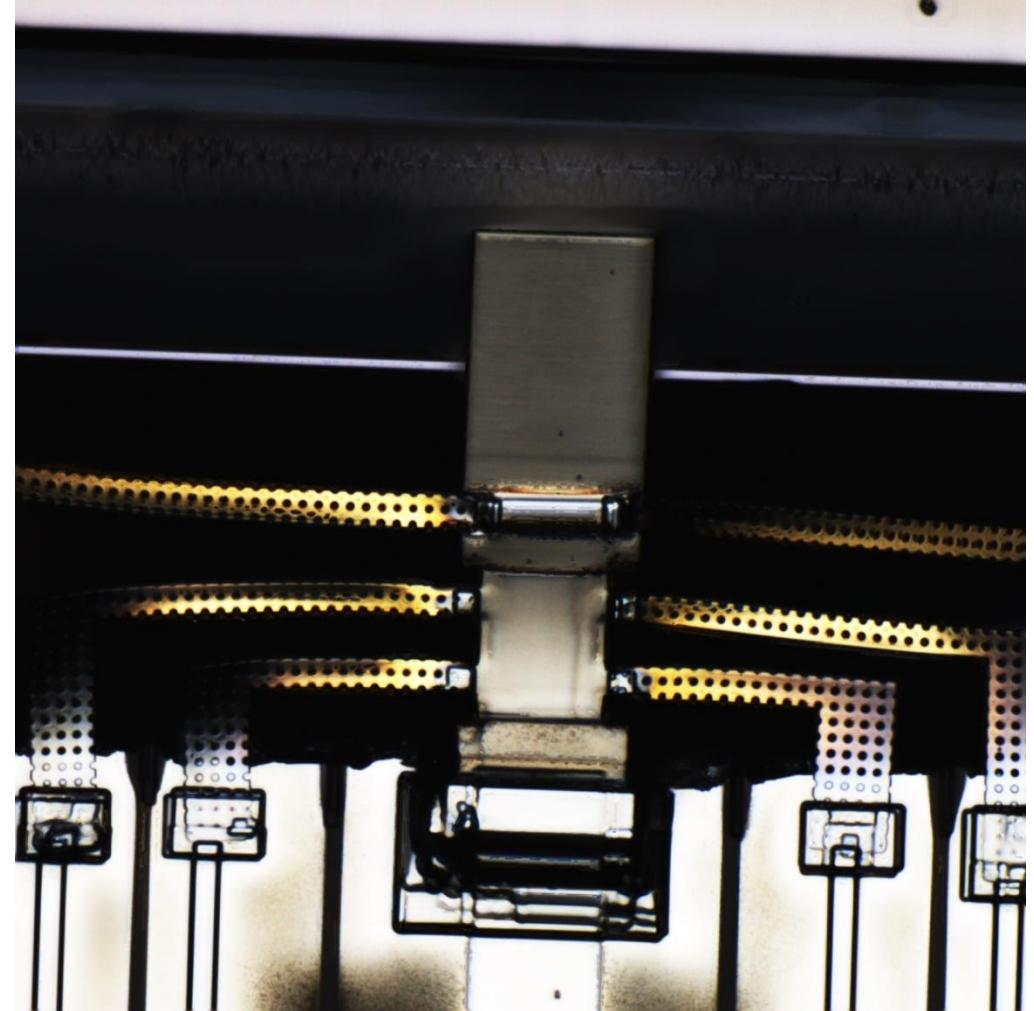
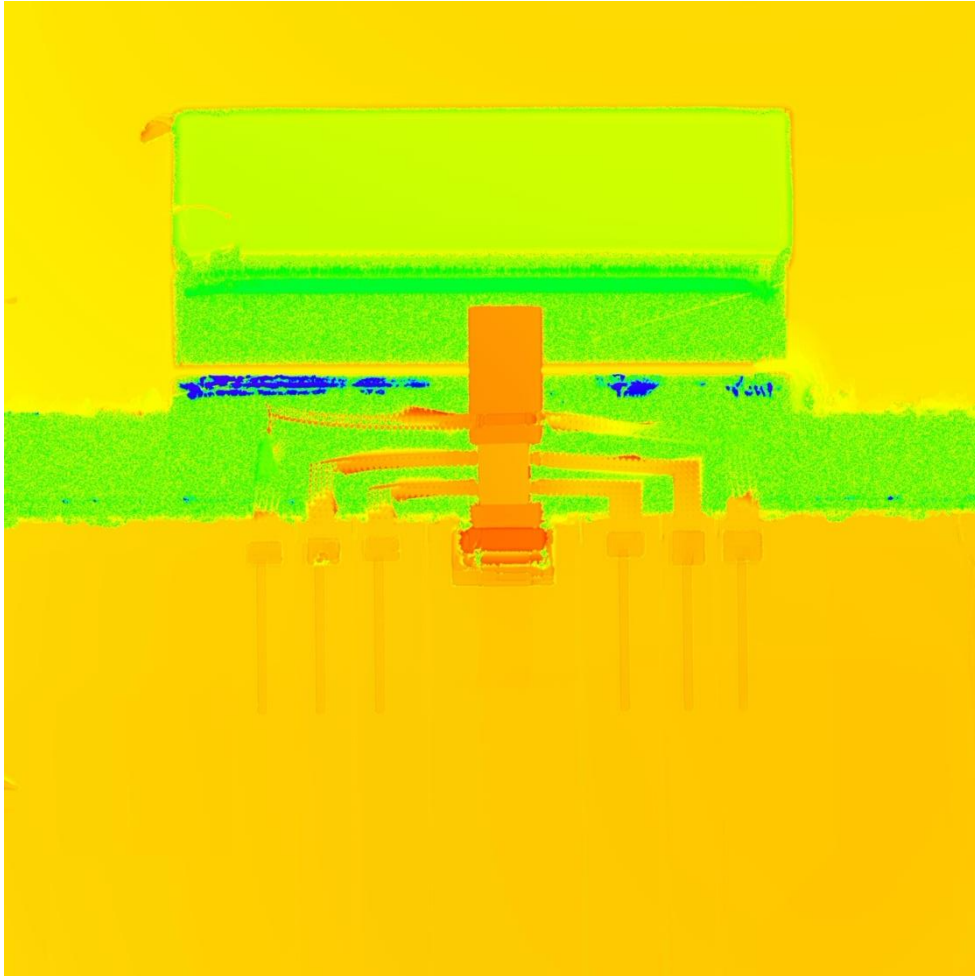


110 – in-plane

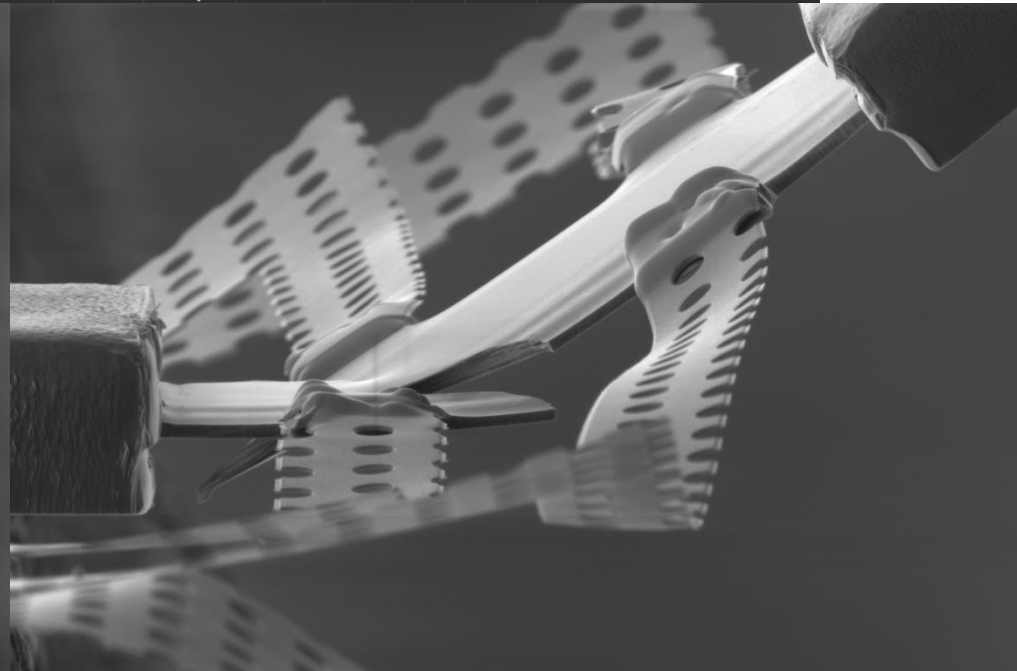
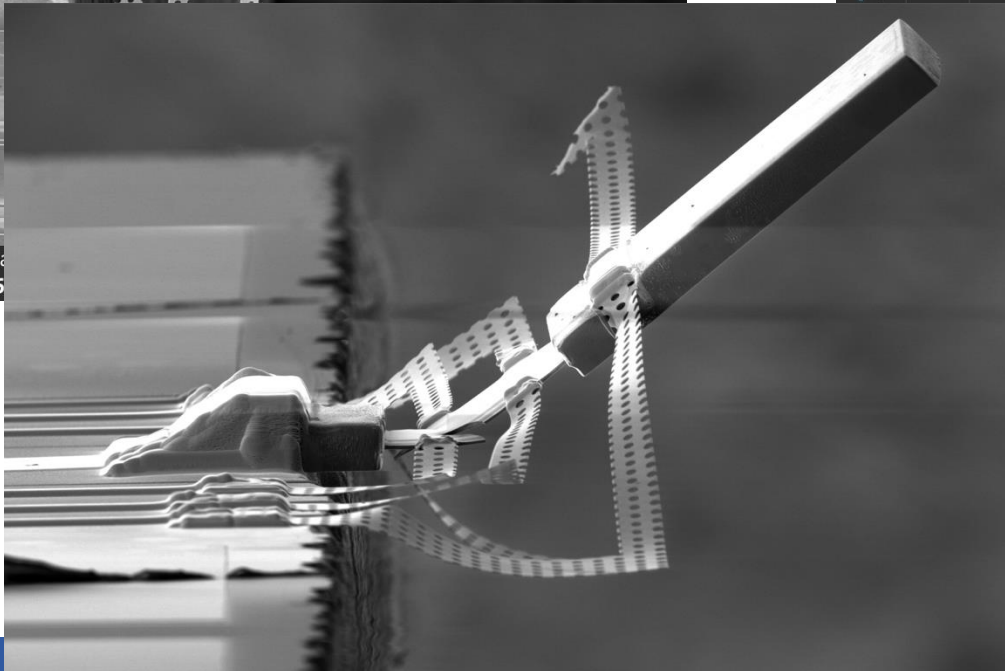
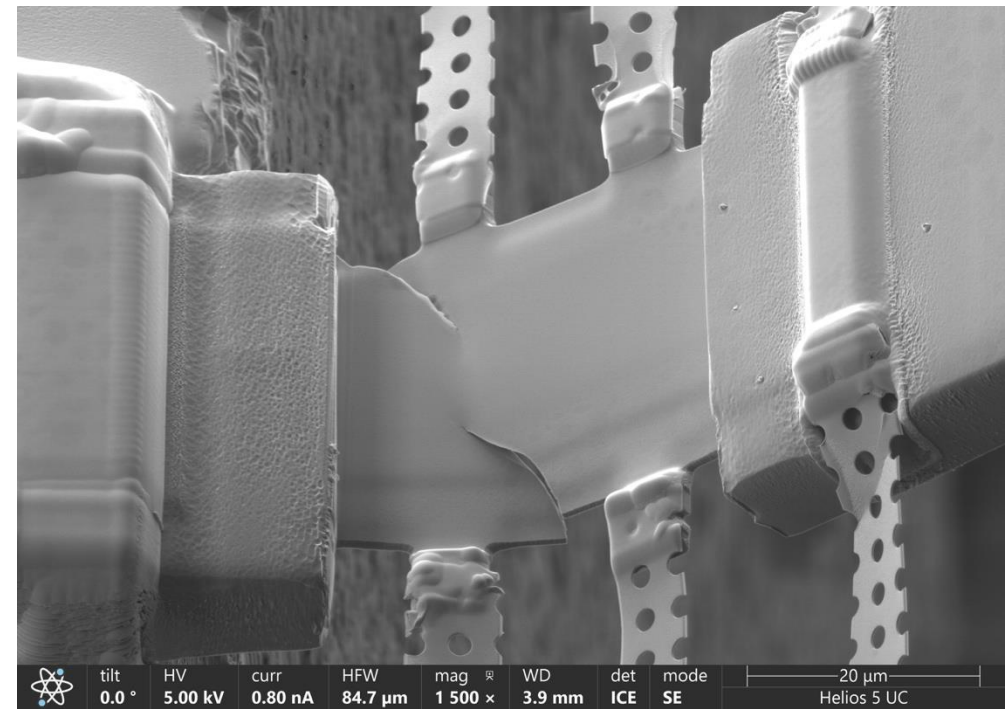
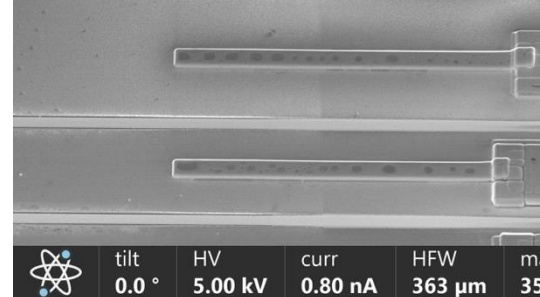
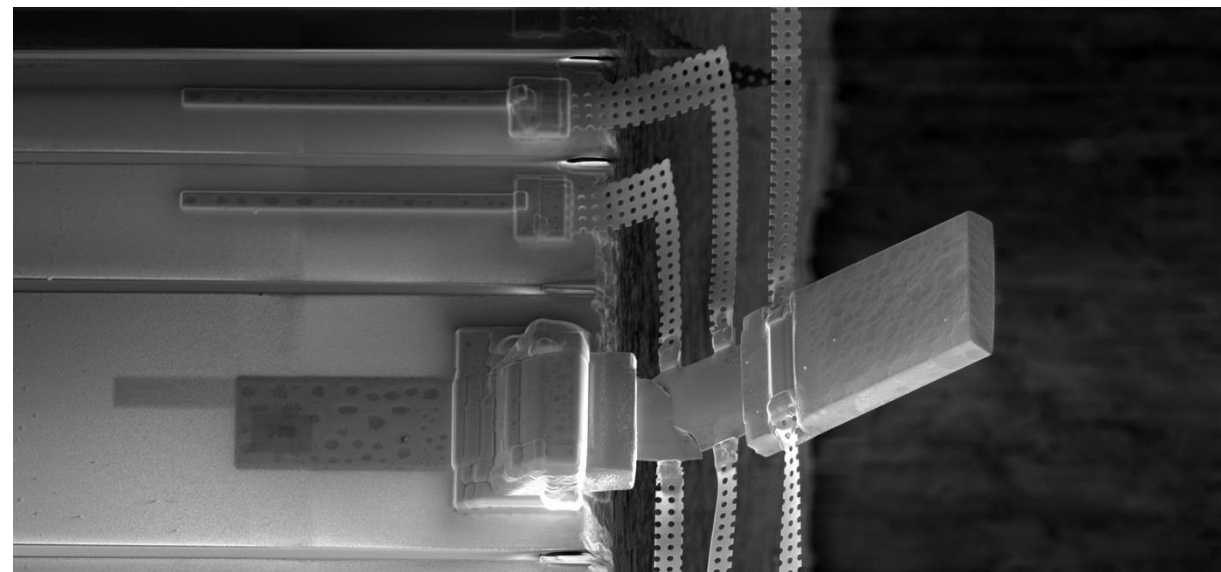


Laser Microscope:

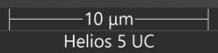
Circle approximation holds, no twist angle while bending.



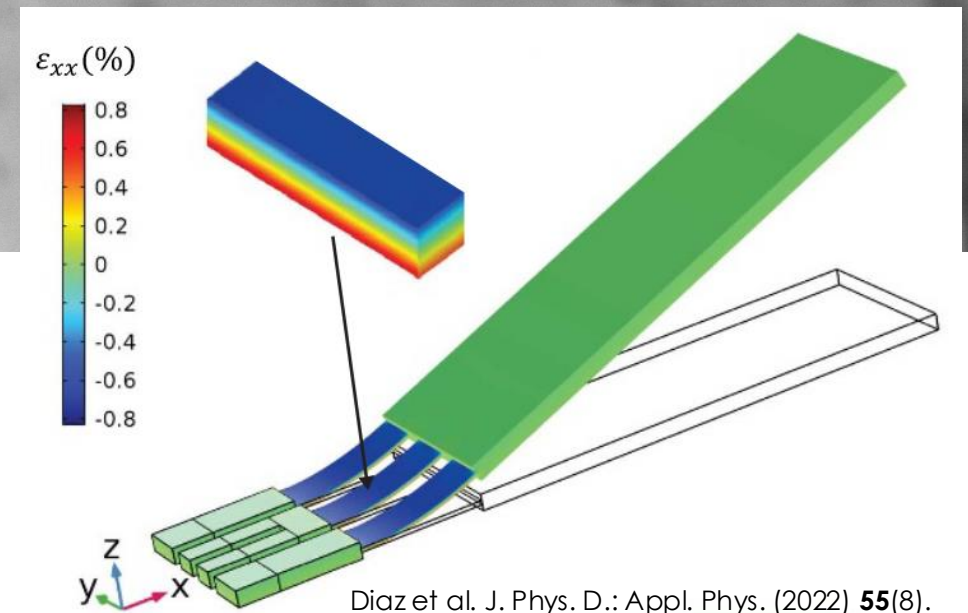
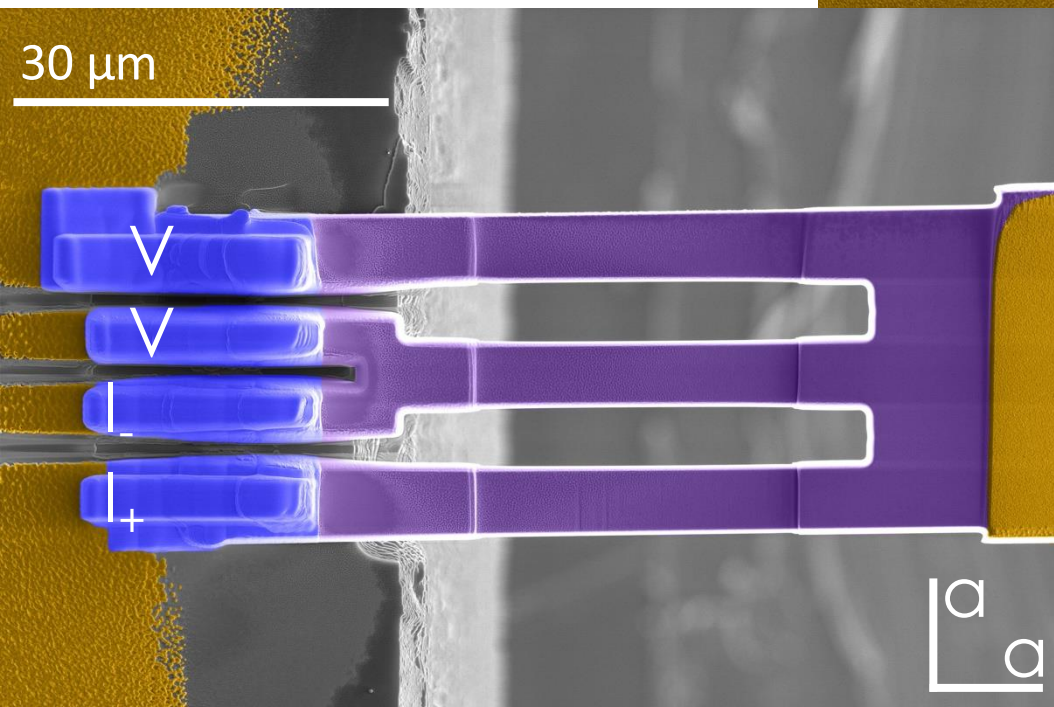
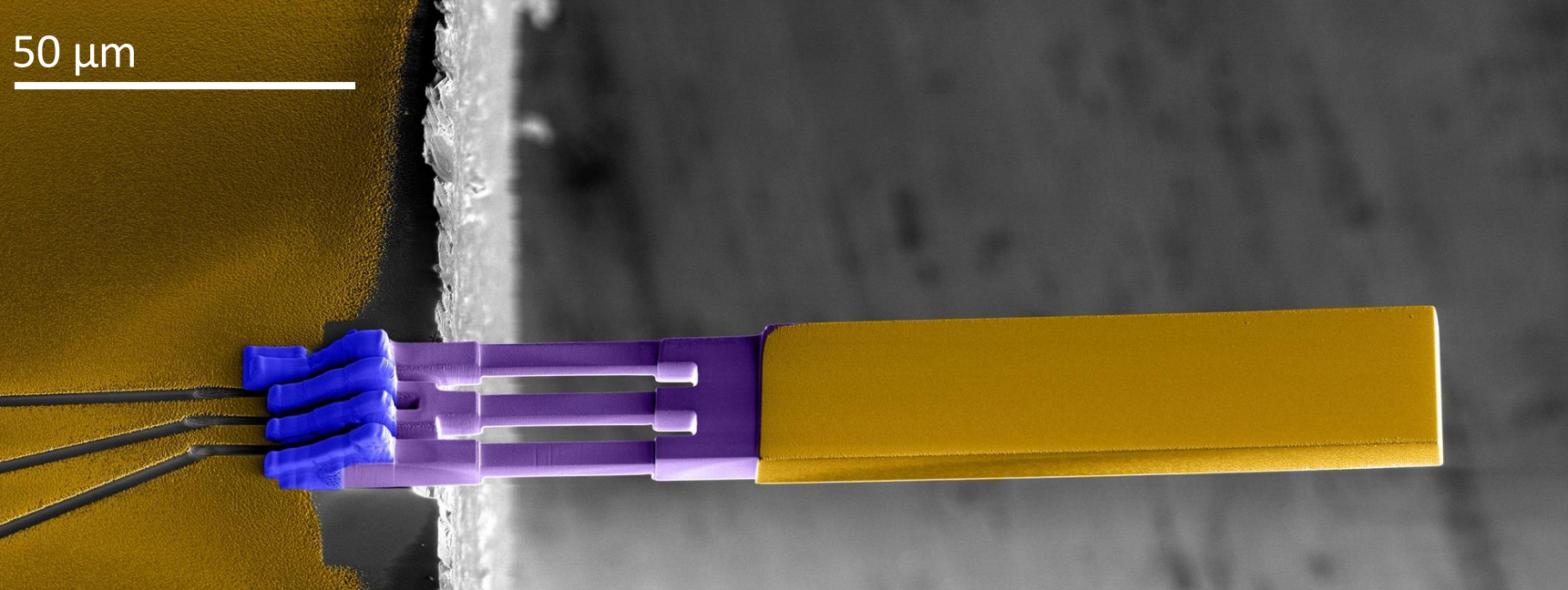
Dead

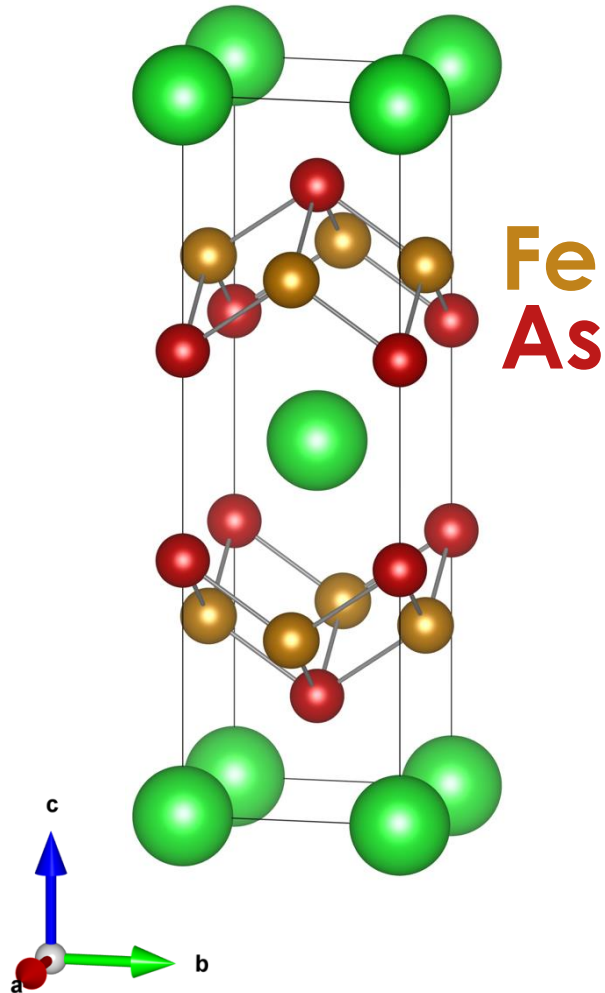
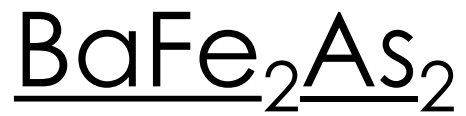


03.09.2026

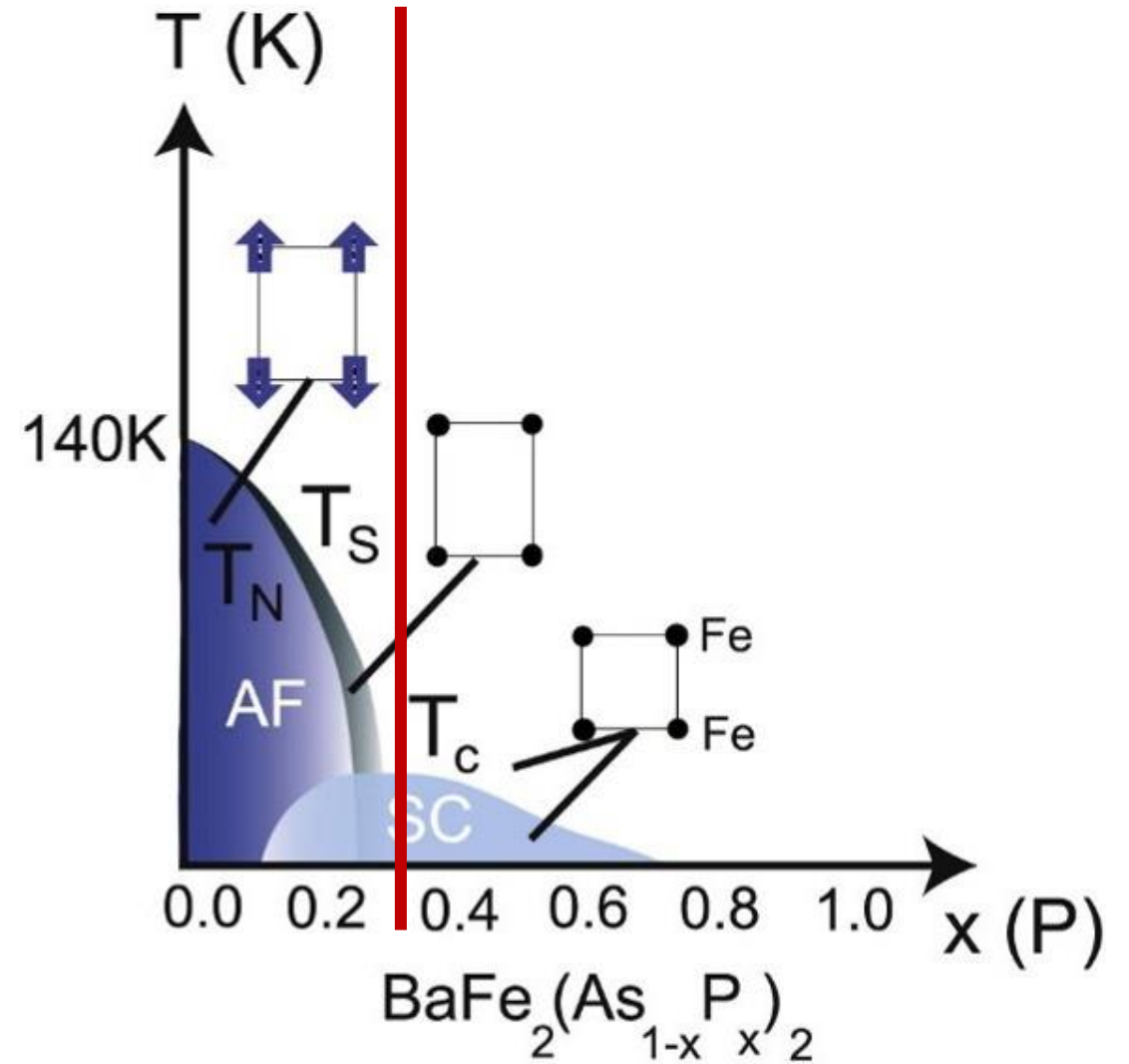
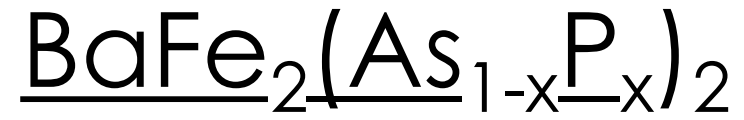


Devices and Geometry





K. Momma et al. *J. Appl. Cryst.* **44**, 1272-1276 (2011)
 JE. Jørgensen et al. *Eur. Phys. J. B* **78**, 411-515 (2010)



F. Shimojima, *Solid State Comms.*, **152(8)**, 695-700, (2012)

Flexoresistance – 20% P

