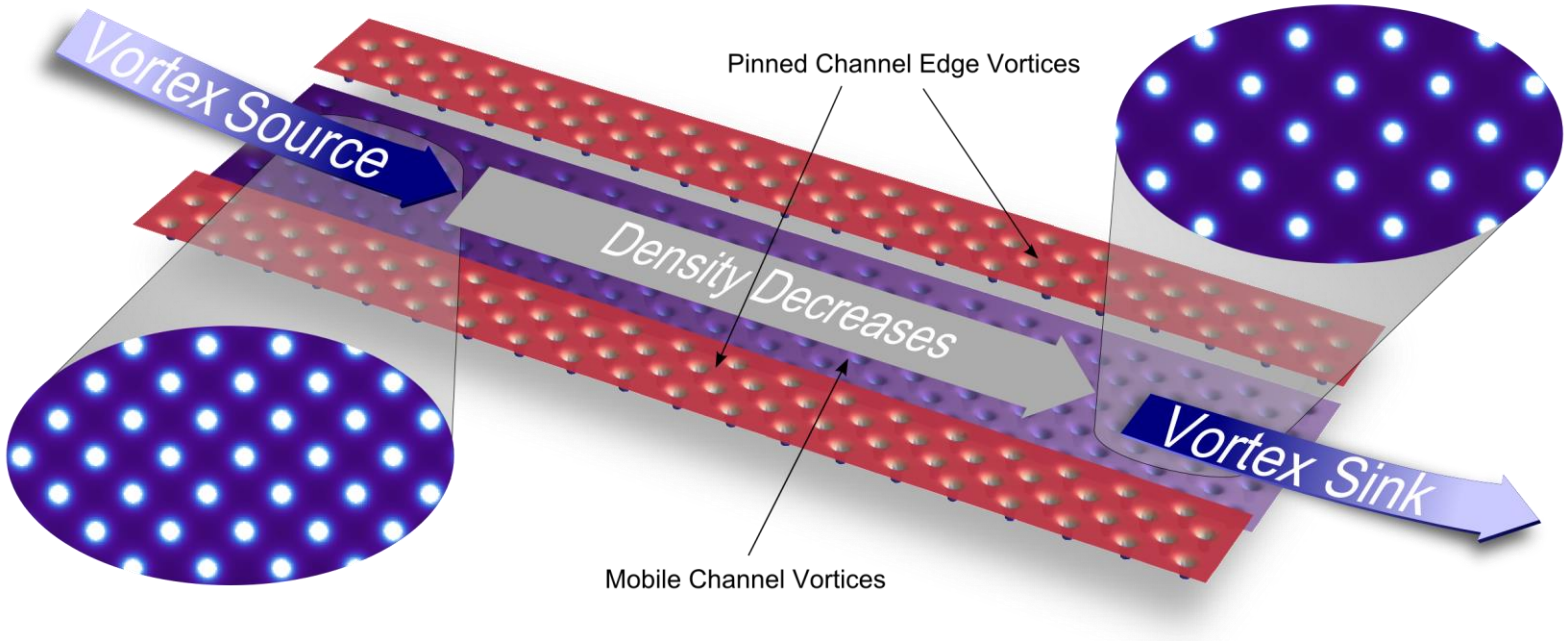
Extrusion of a vortex lattice



School of Physics and Astronomy

Theoretical Physics Group

Jonathan Watkins

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Extrusion of a vortex lattice

Thanks

- Supervisor: Dr. Nicola Wilkin

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RESEARCH COMPUTING
INNOVATING TOGETHER

EPSRC
Pioneering research
and skills

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Extrusion of a vortex lattice

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Extrusion of a vortex lattice

My front room → superconductor

Toothpaste → vortices of magnetic field

Oliver → vortex source

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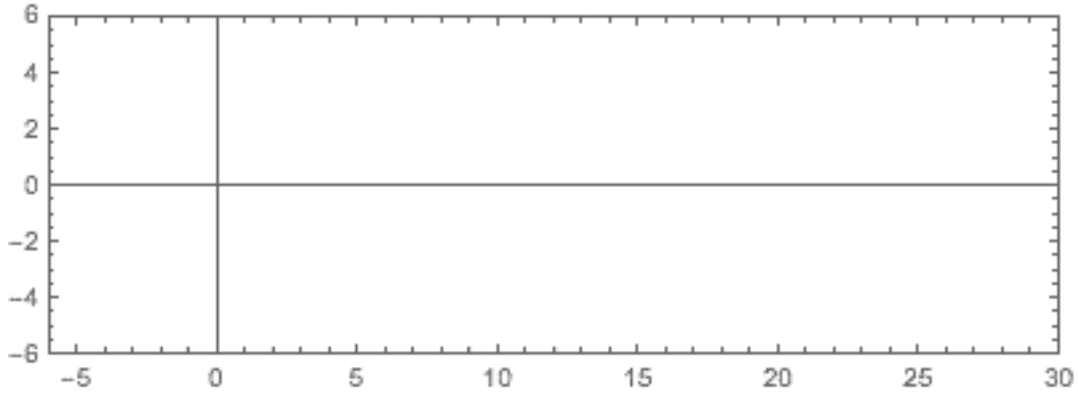
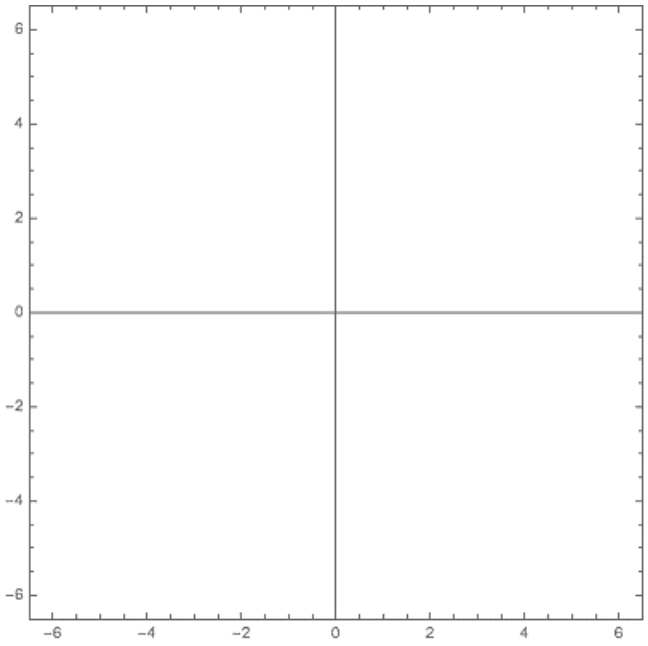
Vortex source



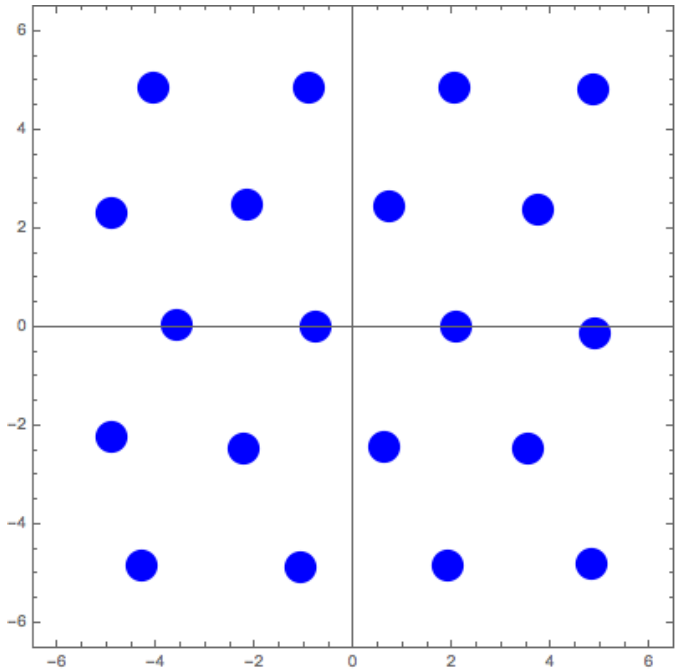
Extrusion of a vortex lattice

Liquid or solid?

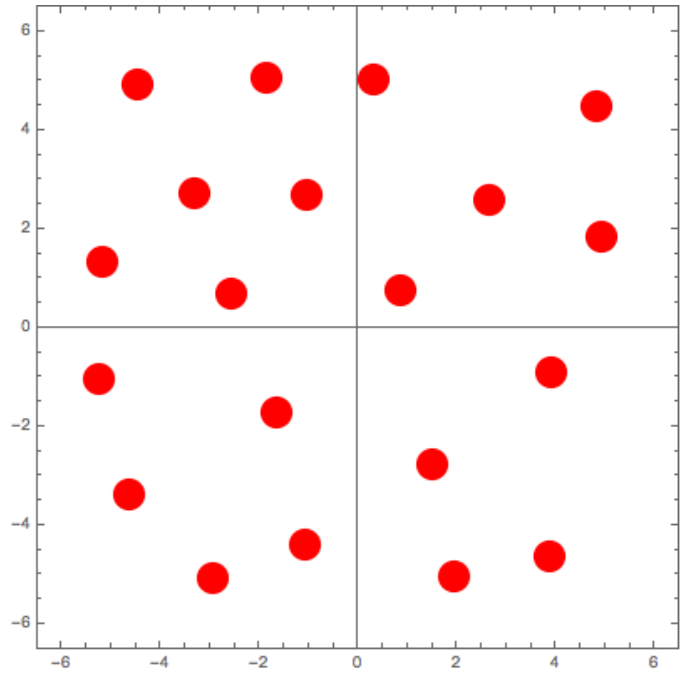


Extrusion of a vortex lattice

Liquid or solid?



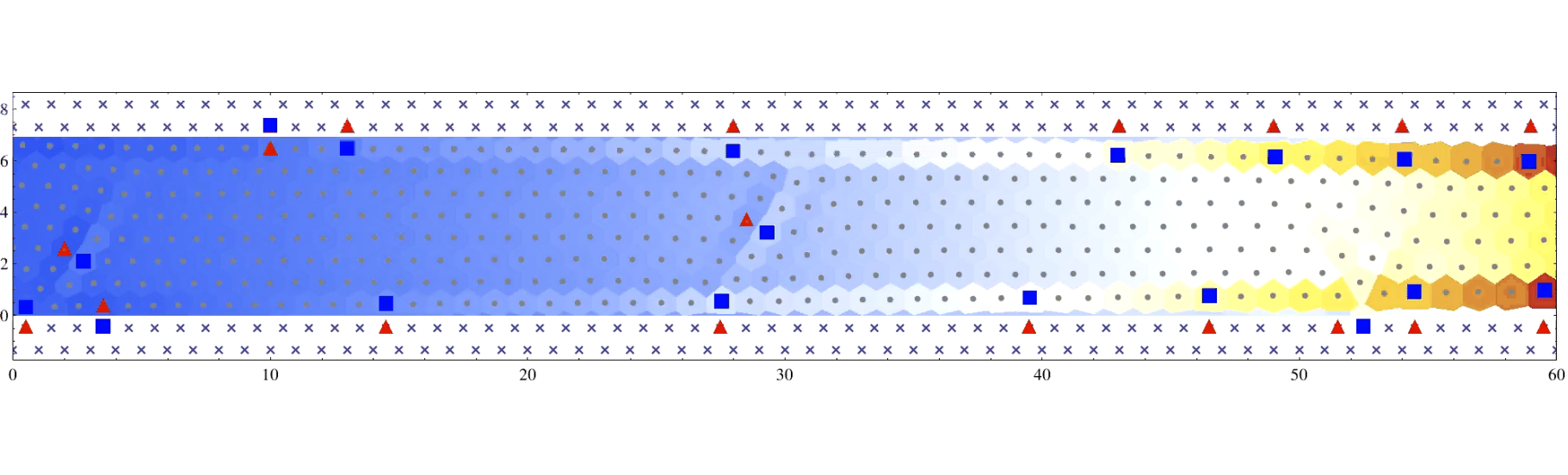
Solid



Liquid

Extrusion of a vortex lattice

Liquid or solid?



How does the solid flow?

- Dislocations enable the *solid* to flow.

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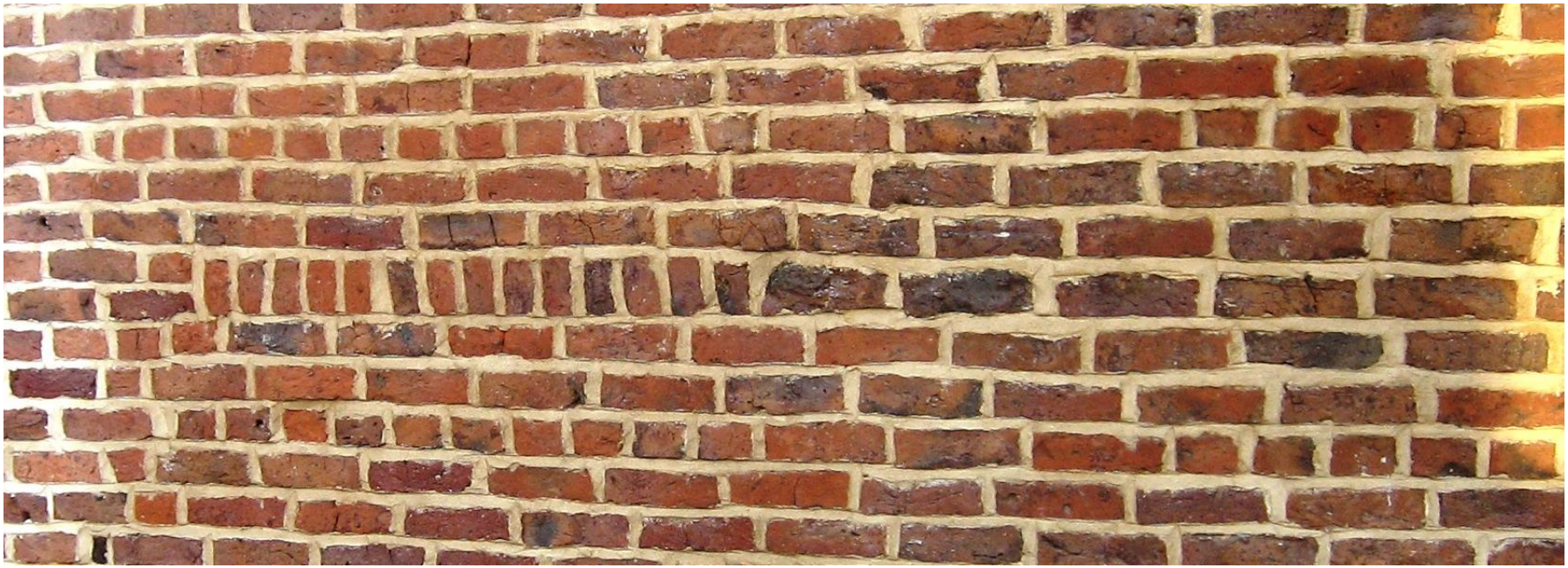
Extrusion of a vortex lattice

Dislocations are ubiquitous

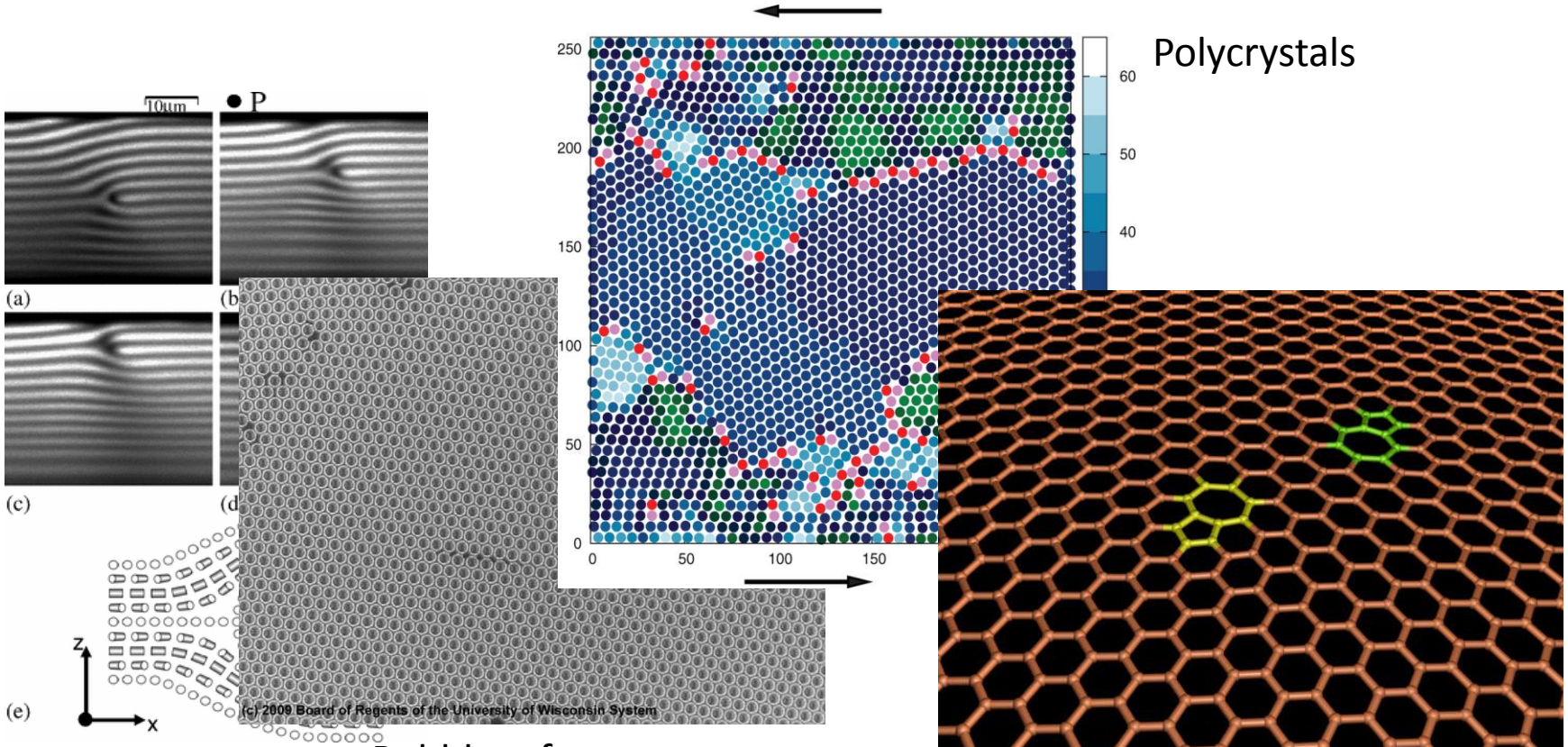
- Can you spot the dislocation?



- Allows a row of material to be removed.

Extrusion of a vortex lattice

Can we find any similar systems?



Polycrystals

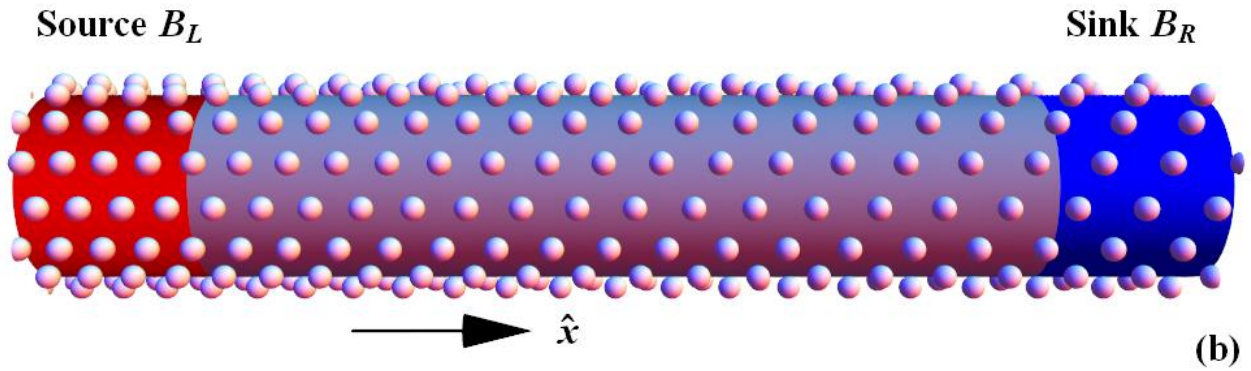
Liquid crystals

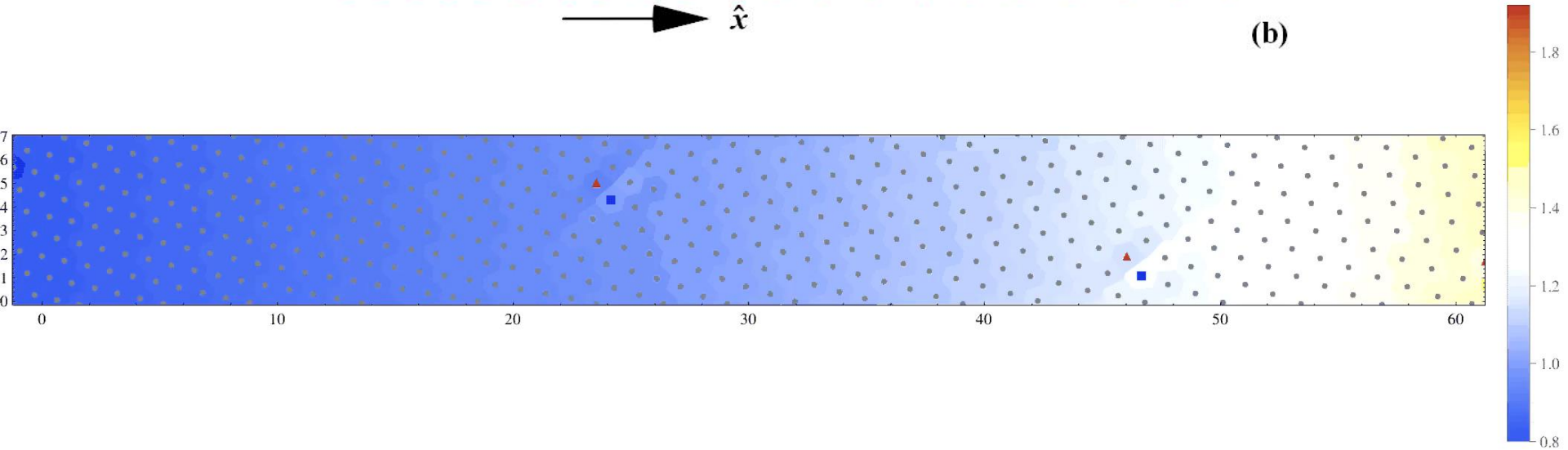
Bubble rafts

Graphine

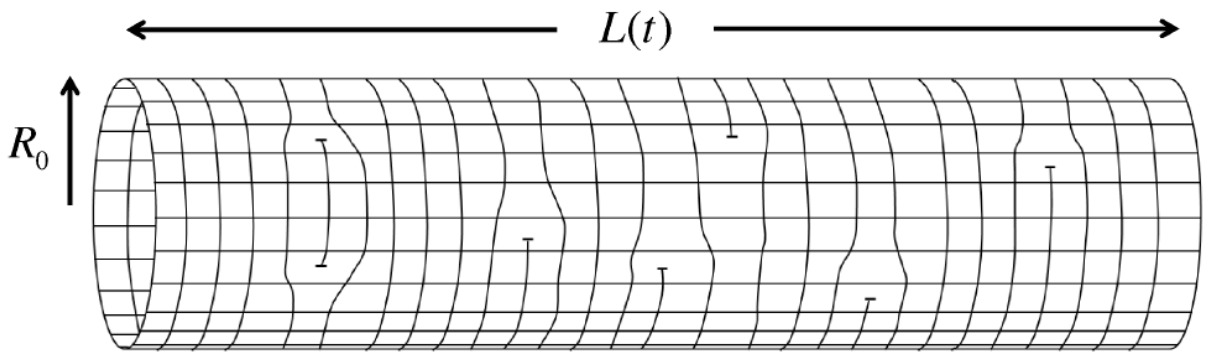
Extrusion of a vortex lattice

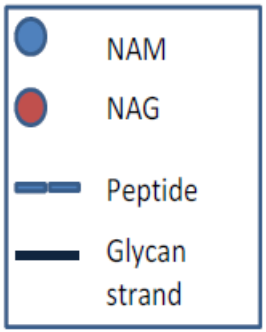
What if we wrap it onto a cylinder?

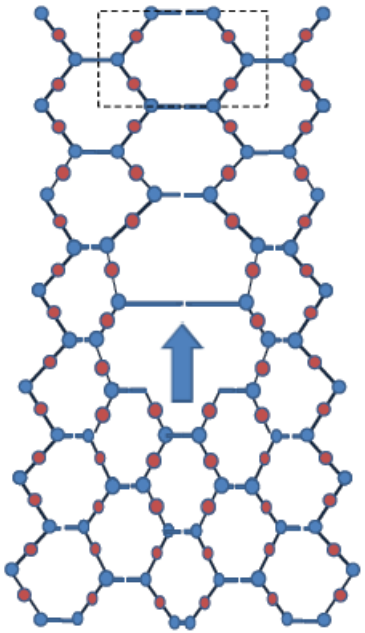




Extrusion of a vortex lattice







- Cell wall elongation of E. Coli bacteria

Summary

- How toothpaste and children are a good model for flowing vortices in a superconductor
- How dislocations are involved in *solid* flow
- Wide array of systems with dislocations.

Thank you for listening

Questions?