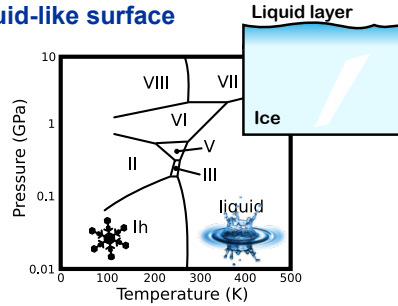




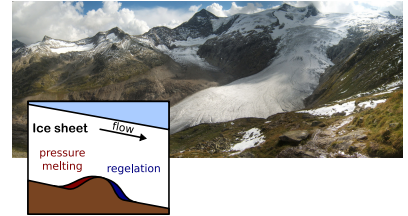
Friction and regelation

- Ice friction due to liquid-like surface
 - surface premelting
 - friction heating
 - pressure melting
- Regelation: pressure melting followed by freezing



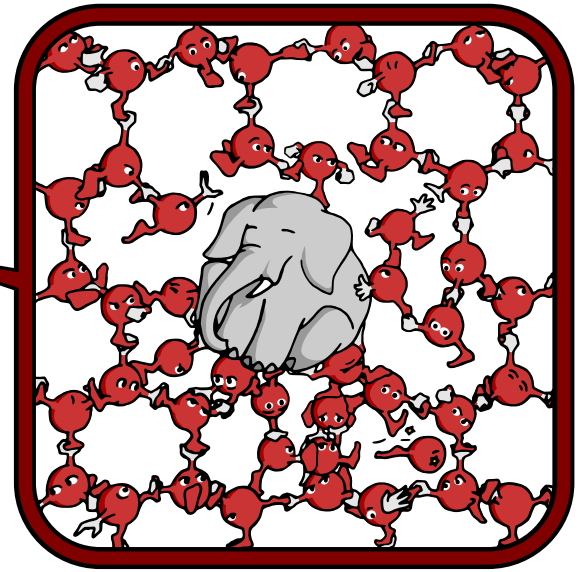
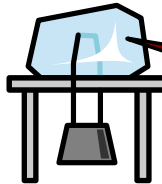
Natural regelation

- Premelting usually dominant
- Regelation affects, e.g., glacial flows



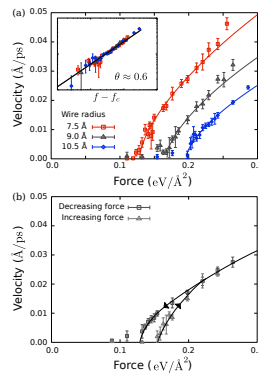
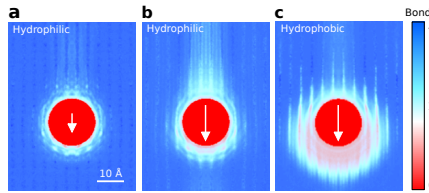
Wire regelation

- Classic experiment: pass weighted wire through ice
- Ice melts under and heals above wire
- We simulate this at the nanoscale

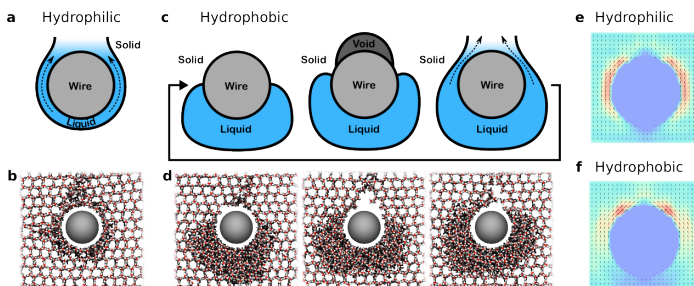


Hydrophobicity effect

- Hydrophilic wire:
 - non-hysteretic onset of movement due to external force
 - surrounded by thin layer of liquid
 - constant flow of liquid

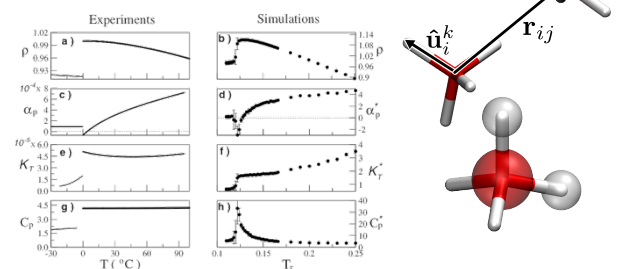


- Hydrophobic wire:
 - hysteretic start / stop
 - liquid volume comparable to wire
 - liquid flows in bursts



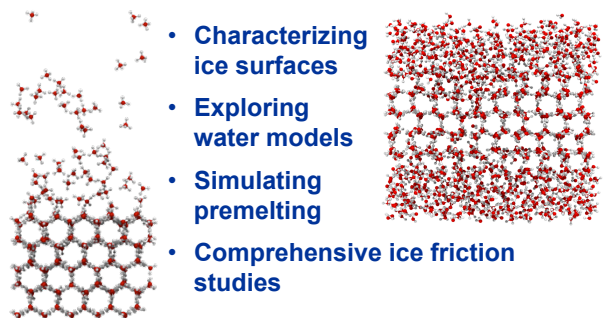
Water model

- Molecular dynamics of the new 3DMB model
- Dangling bonds instead of local charges
- Reproduces, e.g., pressure melting



What now?

- Characterizing ice surfaces
- Exploring water models
- Simulating premelting
- Comprehensive ice friction studies



See also: **Physical Review Letters**
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Focus

PHYSORG



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