Granular and other soft matter: Probe experimentally using **NMR/MRI**

In NMR/MRI, the sample is placed in a strong magnetic field, and then radio-frequency and field gradient pulses are used to probe the motion of hydrogen nuclei.

To date and in progress:
- Vibrofluidized granular bed
- Gas-fluidized granular bed
- Granular flow through a vertical channel

Planned and future:
- Foams
- Emulsions?
- Gels?
- Bio matter?

In granular fluids, heat can flow from cold to hot.

Fit to hydrodynamic theory.
Quantum fluids and solids: Experiments on helium systems at extremely low temperatures and high magnetic fields

To date and in progress:
- Magnetization transport (NMR): field-temperature??
- Momentum transport (viscosity): giant enhancement at very high B/T
- Probe “supersolid” via 3He impurities

Planned and future:
- Hyperpolarized contrast agents for MRI?