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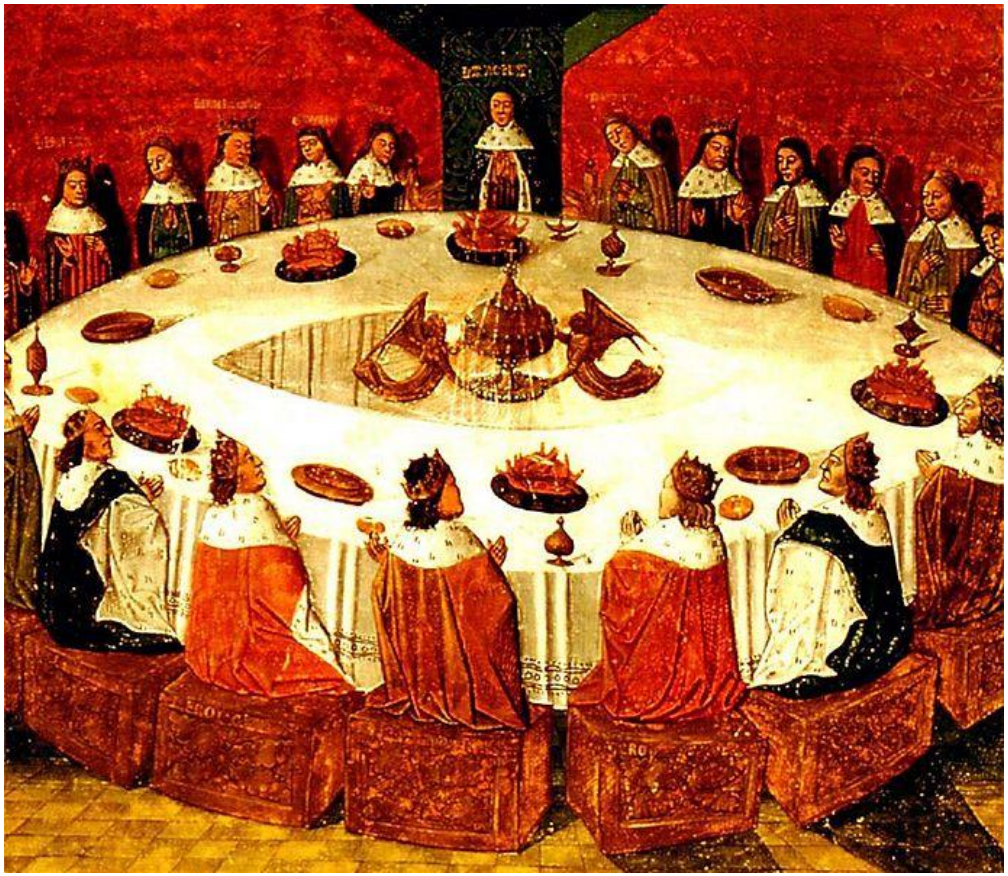
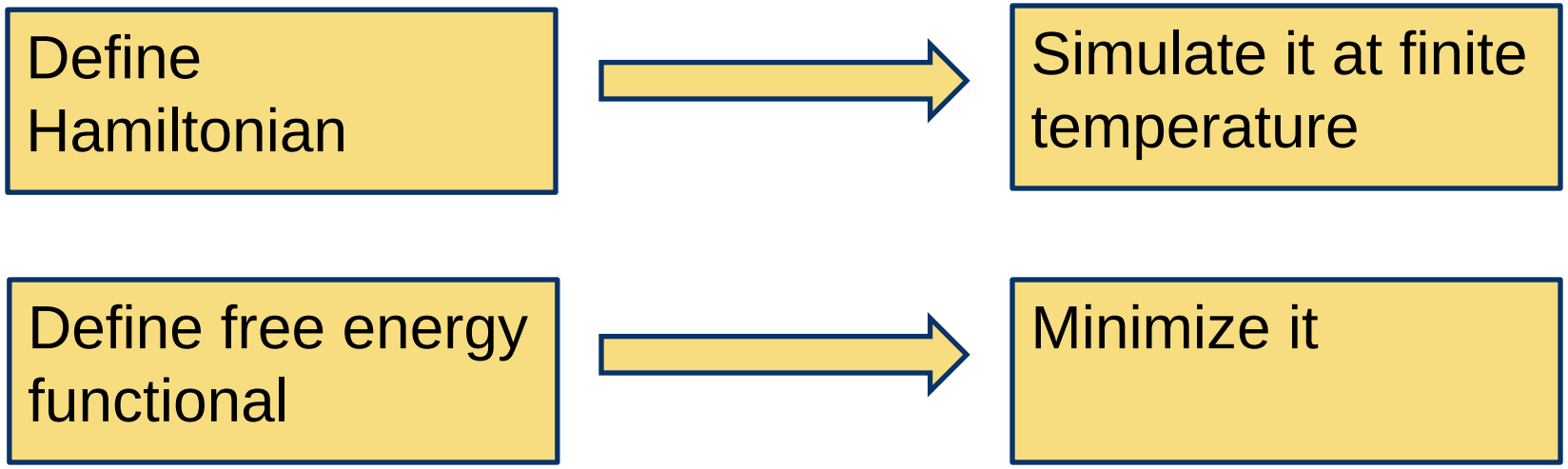
Round Table Discussion



Archetypal problem



Good: *Mathematicians learn from physicists*

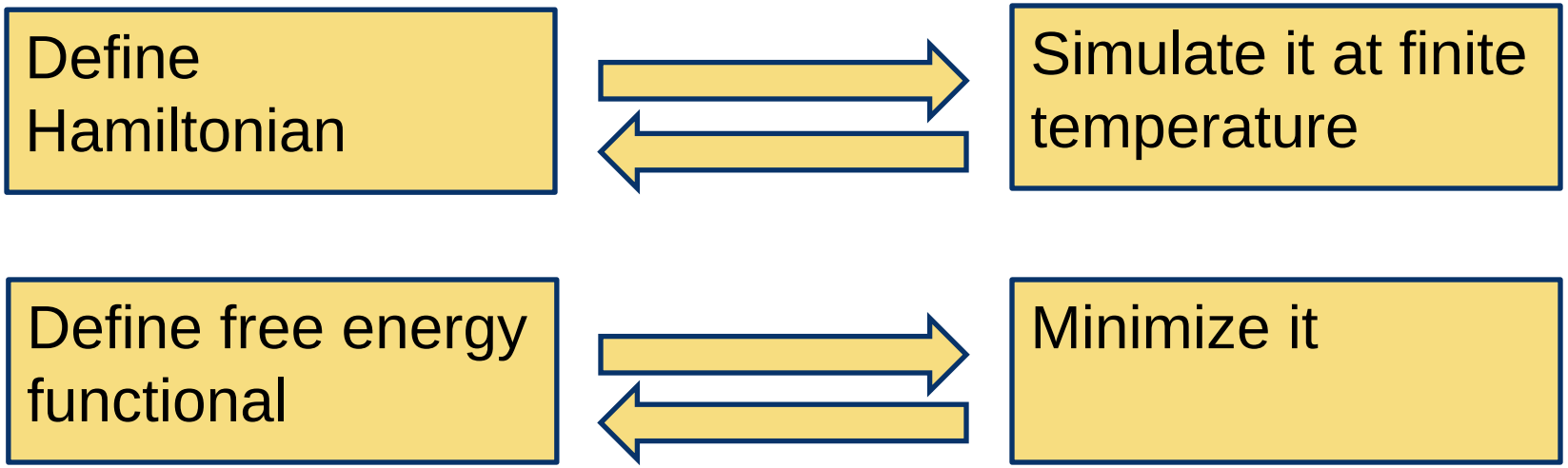
Better: *Mathematicians and theoretical physicists learn from experimental physicists and chemists*

Methods:

Monte Carlo
Molecular dynamics

PDE algorithms
Finite element

Discussion point #1



Lemma:

If minimizing your free energy gives you crazy results, then you are minimizing the wrong free energy.

Discussion point #2

Two methods are missing from the list.
What happened to them?

1. Construct variational ansatz, insert into free energy, minimize over parameters.
2. Don’t just minimize over order parameters; ***integrate*** over order parameters to account for thermal fluctuations.

Discussion point #3

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Polydispersity as an axis in a phase diagram

- Methods to treat polydispersity
  - Know how to describe systems with 2 components (or a small number of components) $\Rightarrow$ 2-phase coexistence regions in phase diagram
  - Does new behavior emerge when there are many components?
- Effects of polydispersity
  - On crystalline or smectic order
  - On orientational order

Discussion point #4

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Among all the topics discussed in this workshop, we have seen a strong emphasis on modeling biaxial nematic phase.

- Why?
  - Experimental controversy?
  - Technological applications?
- Principles that can be applied to other types of order?
  - Polar
  - Generalized nematic: Cubatic, tetrahedratic
  - Quasicrystalline