Outline

These lectures should provide an introduction to the statistical mechanics of the glass transition, i.e. the transition between a fluid to an arrested amorphous state of matter.

I) Basis of glass formation

Ediger, Angell, Nagel. "Supercooled liquids and glasses." The journal of physical chemistry 100.31 (1996): 13200-13212.

Ediger, "Perspective: Highly stable vapor-deposited glasses." The Journal of chemical physics 147.21 (2017).

Berthier, Ediger. "Facets of glass physics." Physics today 69.1 (2016): 40-46.

II) Mean-field theory of the glass transition

Parisi, Urbani, Zamponi. Theory of simple glasses: exact solutions in infinite dimensions. Cambridge University Press, 2020.

III) Lattice models for glasses

Garrahan, Sollich, Toninelli. "Kinetically constrained models." Dynamical heterogeneities in glasses, colloids, and granular media 150 (2011): 111-137, arXiv:1009.6113.

IV) Atomistic models

Berthier, Reichman. "Modern computational studies of the glass transition." Nature Reviews Physics 5.2 (2023): 102-116.