* Physical Parameters
  + Ejecta masses
  + Velocities
  + Angular structure
  + Electron fraction
  + Luminosity distance
  + Inclination angle
* Modeling is goes from physical parameters to light curves, and light curves can go to parameter estimation
* Classes of KN models
  + Semi-analytic
  + Simulations of photon propagation
  + Underlying hypotheses: input mass distribution as concentric layers of velocity (homologous expansion R(v) = v•t)
  + Ejecta heated by decay of r-process elements -> thermal radiation -> a fraction of luminosity escapes (depends on opacity)
  + Not including effects of central engine
* Modeling uncertainties
  + Approximations of heating rates and opacities
  + Sizeable error margins in lanthanide opacity experimental constraints
  + Surrogate model approximations
  + Expansive simulations are only run on a discrete grid of parameters
  + To generate a light curve for any combination of parameters you need interpolation
    - Dimensionality reduction
    - Analytical or neural network-based interpolation
* Parameter estimation: Bayesian inference
  + Use Nuclear Multi-Messenger Astronomy (NMMA) framework
  + Nested Monte-Carlo sampling
  + Maximizing likelihood
* Limitations of parameters recovery
  + Given an ideal simulated event
  + What are the best possible constraints of parameter estimation?
  + How do constraints loosen when observations lack?
* Ongoing work
  + Investigate the modeling sources of uncertainty to reduce the error margin
  + Figure out if some observing window/filter choice combinations are more constraining than others, which ones are essential?