SN Ia Simulation and Validation Pipeline

Smoldering Phase

Turbulent Nuclear Burning

Transition to Detonation

Thousands of Simulations of Hydrodynamc Explosive and Radiative Transfer Phases

FLASH

Initial Conditions Physics Input

SNIa Explosion Reactive Flow Fluid Dynamics

Nucleosynthesis Postprocessing

Free Expansion Model Assembly

Light Curves, Spectra, and Polarization

Final SNIa Model Assembly

Predictive Science Statistical Methodologies

SN Ia Observations

Large–Scale Structure Simulations

0 – 3 s

3 s – 100 d

Validation and Predictive Science