

Summary of Type Ia, XRB, Nova Working Group

SNe Ia

- Theory Needs

- Single degenerate models well explored
- Variety of outcomes for double degenerates—needs more exploration
- Why width-luminosity relation in the lightcurve?

- Observational Needs

- What is the progenitor?
- IR observations (next gen telescopes) can get abundances of IME, isotopic ratios
- New transients / variety of SN—what is normal? .Ia? Weak explosions?

- Experiment Needs

- $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$, $^{12}\text{C}+^{12}\text{C}$, ...
- Weak interactions (affect ^{56}Ni)—need more/better measurements [(p,n), etc.] + theory advances

XRBs

- Theory Needs

- PRE models (ash to surface?)
- Variety of bursts all need modeling, with rate sensitivity (database under construction)
- Burst trigger? (multiple sites?)

- Observational Needs

- Superburst precursors?
- Are ashes brought to the surface? Is there significant ejection?
- Crust cooling

- Experimental Needs

- Need complete mass/half-life measurements
- Precise rates can help reduce uncertainties in matching models to observations
- Pin down key rates (FRIB will significantly improve)

Novae

- **Theory Needs**

- Everything (according to Sumner)
- How do we get mixing? And how do we stop it?
- Not much focus on early evolution in multi-d
- High energy gamma rays—how?
- Are hotter models needed to explain heavy elements?

- **Observational Needs**

- Do WDs grow in mass?
- WD masses in nova systems
- Need isotopic abundances of ejecta

- **Experimental Needs**

- Measurement of radionuclide production/destruction reaction rates
- Measure bottleneck and hot CNO breakout reactions