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Probing the Depths: Confronting Supernova Explosion Models with Observational Data

ANL HEP LDRD Brainstorm 2010

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of Energy

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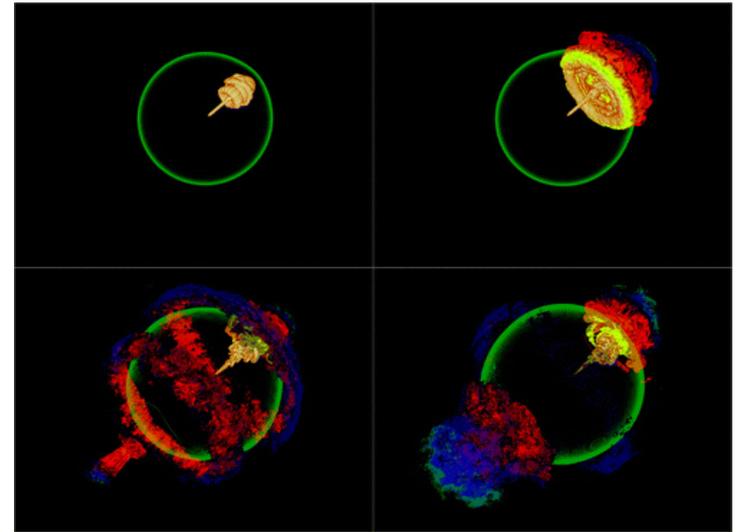
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Thermonuclear Supernova (SN Ia) Light Curve Origins

- Age of precision cosmology has arrived & 1% constrains are demanded
- SN Ia cosmology on the verge of being limited by systematic uncertainties
- Difficulties tracing SN Ia light curves to detonation scenarios persist
 - first principles elusive
 - requires reliance on parametric models
- Kuhlmann & Bernstein joined FNAL & U. Chicago scientists in
 - successful Seed Grant proposal
 - study utilizing SDSS light curves & simulated SN Ia explosions (see image)



Jordan et al. 2008, ApJ, 681, 1448

- Pressing issue: simulated light curve brightness and width incorrectly anti-correlated
- Possible LDRD PI: Ray Bair, Mike Papka, Katherine Riley
- Strategic on road to exascale

Codes In Play

■ FLASH: scales to full ANL BG/P

■ SEDONA: radiative transfer

