

# Soft and Hard X-Ray Components from Type IIa Supernovae: Evidence for Asphericity in the CSM

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Observations: We performed multi-epoch X-ray analyses of three nearby **Type IIa supernovae**, **2005kd** (@64.2 Mpc), **2006jd** (@79 Mpc), **2010jl** (49 Mpc).

Results: We found that the X-ray spectral evolution can be characterized by the following three phases:

- Phase-1) Hard component**
- Phase-2) Soft and hard components**
- Phase-3) Soft component**

## Interpretation:

The hard and soft components are responsible for “strongly” and “moderately” absorbed high-T (forward shock) thermal emission, respectively. The spectral evolution observed requires a departure from a spherical symmetry in the CSM, most likely a **torus-like geometry of a dense CSM**.

