

Abstract Submitted  
for the DPP05 Meeting of  
The American Physical Society

**The Explosion of Cassiopeia A** UNA HWANG, NASA GSFC/JHU  
— The 330 year old Galactic supernova remnant Cassiopeia A offers a uniquely detailed look at the supernova ejecta formed during its explosion through current X-ray and optical observations, including a deep 1Ms observation with the Chandra Observatory. The explosively synthesized ejecta are distributed in small-scale knots and filaments with an overall bipolar symmetry and X-ray spectra dominated by emission lines of Si, S, Ar, and Ca, with some Fe, except in Fe-rich regions of the remnant where the Fe lines are very strong. The displacement of the compact stellar remnant relative to the optically determined explosion center indicates that the birth kick of the neutron star had a component perpendicular to the polar axis of the ejecta. From modelling the X-ray spectra, we learn that the explosion energy was distributed aspherically, that the progenitor underwent substantial mass loss, and that the ejecta along the polar axes originated as “jets” during the explosion rather than being shaped by the progenitor’s pre-supernova mass loss. The energetics of Cas A’s explosion indicates that it was probably formed as a slightly energetic supernova.

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Date submitted: 22 Jul 2005

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