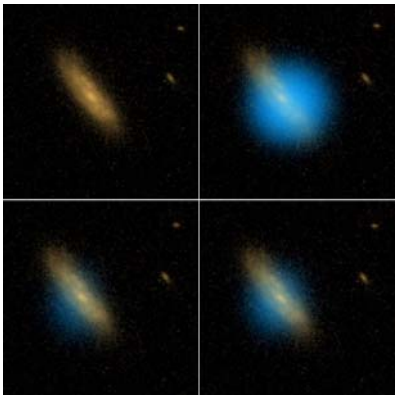
Supernova "Shock Breakout" Seen From Red Giant



Ker Than
for National Geographic News

The ultraviolet flash that signals the explosion of a red supergiant star has been detected by astronomers for the first time.

"We have witnessed the violent death of a massive star in a galaxy almost a billion light-years away in unprecedented detail," said study team member Kevin Schawinski, an astrophysicist at the University of Oxford in the U.K.

Seeing such "first light" from supernovae could help astronomers better understand what's happening inside massive stars in their final moments.

Breakout Caught

Red supergiants are the most common stars that end their lives as supernovae.

These massive stars explode when the fuel that sustains nuclear reactions inside their cores is depleted.

The cores then collapse under their own immense weight, and the stellar breakdown generates a shock wave that plows outward through the star.

The moving shock wave heats material in front of it to several hundred thousand degrees.

For a brief moment, the stars shift from red-hot to white-hot and beyond, until they shine mostly in ultraviolet and x-ray light known as the shock breakout.

"For a moment the star is almost transparent, and this flash of light comes out," Schawinski told National Geographic News.

A sequence of ultraviolet images released in June 2008 shows a supernova from start to finish. Just before the explosion, the host galaxy (top left) appears relatively quiet. Then a bright ultraviolet flash called a shock breakout (top right) signals that the core of a red supergiant star has collapsed.

Moments later the flash is mostly gone, although remnants of the star continue to spread outward The debris expands quickly, heating up again and becoming brighter A few days later it wwould be ten times the size of the original star and would be visible to supernova hunters.