2/14/04

Happy Valentine's Day!!

Exam 1 back Wednesday

Betelgeuse?

News? No Hubble Rescue in budget

Wheeler meetings last week: Dark Energy Satellite, Astrobiology - Mars, Titan

Pic of the day - Rosette Nebula

Surrounding open stellar cluster

Reading:

Chapter 6 Supernovae

Also § 2.1, 2.2, 2.4 & 2.5 for background

Issues to look for in background:

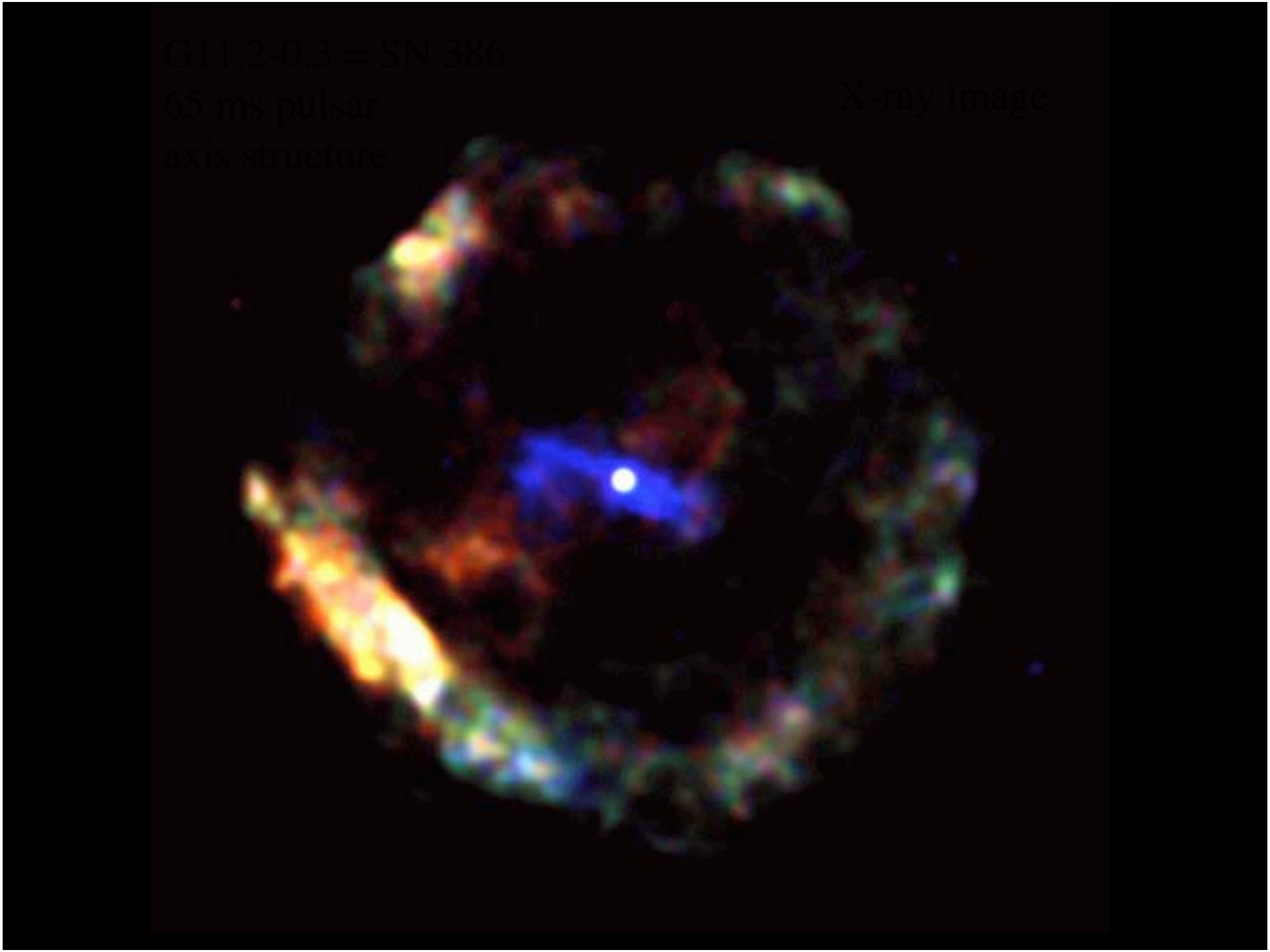
Why is it necessary for a thermonuclear fuel to get hot to burn - charge repulsion § 2.1 & 2.2

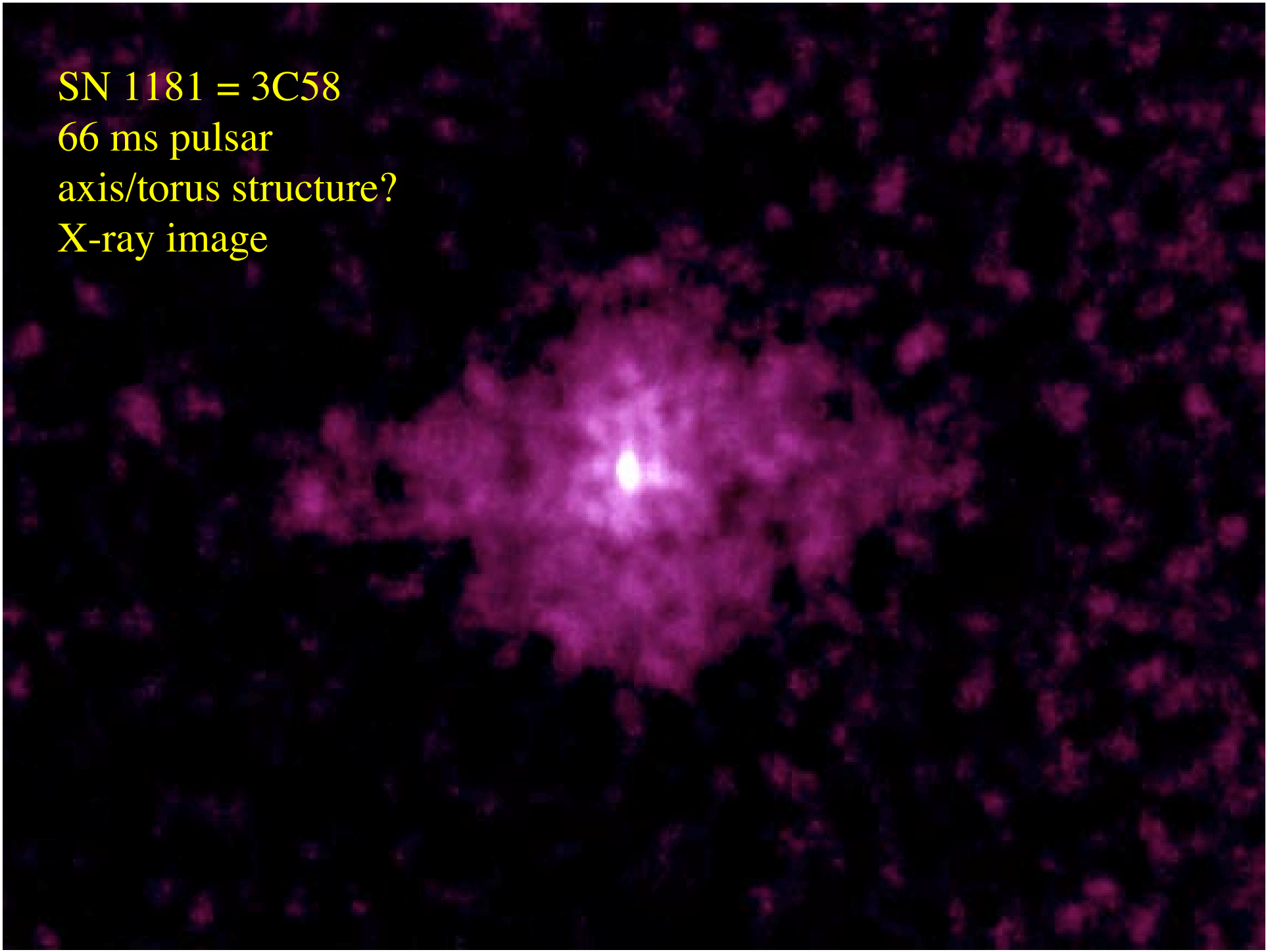
Core Collapse § 2.4 & 2.5

Chapter 6 Supernovae

Historical Supernovae - ***in our Milky Way Galaxy*** observed with naked eye over 2000 years especially Chinese (preserved records), but also Japanese, Koreans, Arabs, American Indians, finally Europeans.

SN 386	earliest record	NS, jet?
SN 1006	brightest	No NS
SN 1054	Crab Nebula	NS, jets
SN 1181	(Radio Source 3C58)	NS, jets
SN 1572	Tycho	No NS
SN 1604	Kepler	No NS
~1680	Cas A	NS? jets
SN 1987A	nearby galaxy	NS? jets
Vela	10,000 years ago	NS, jets


G11.2-0.3 = SN 386
65 ms pulsar
axis structure
X-ray image

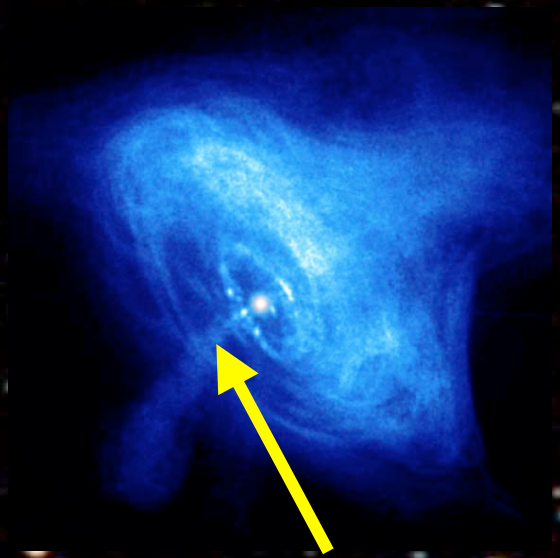

SN 1181 = 3C58
66 ms pulsar
axis/torus structure?
X-ray image

Crab Nebula

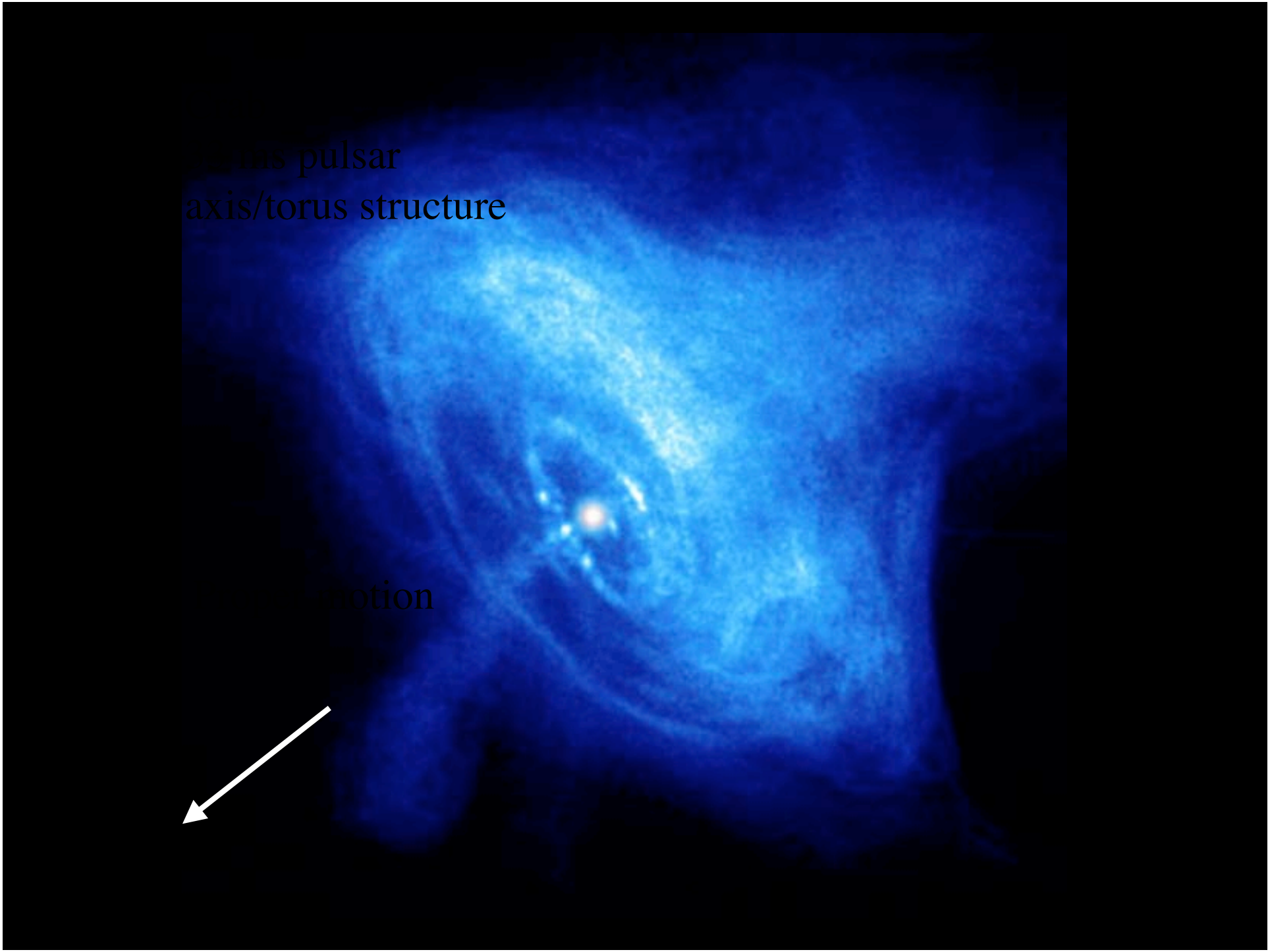
Remnant of "Chinese" Guest Star of 1054

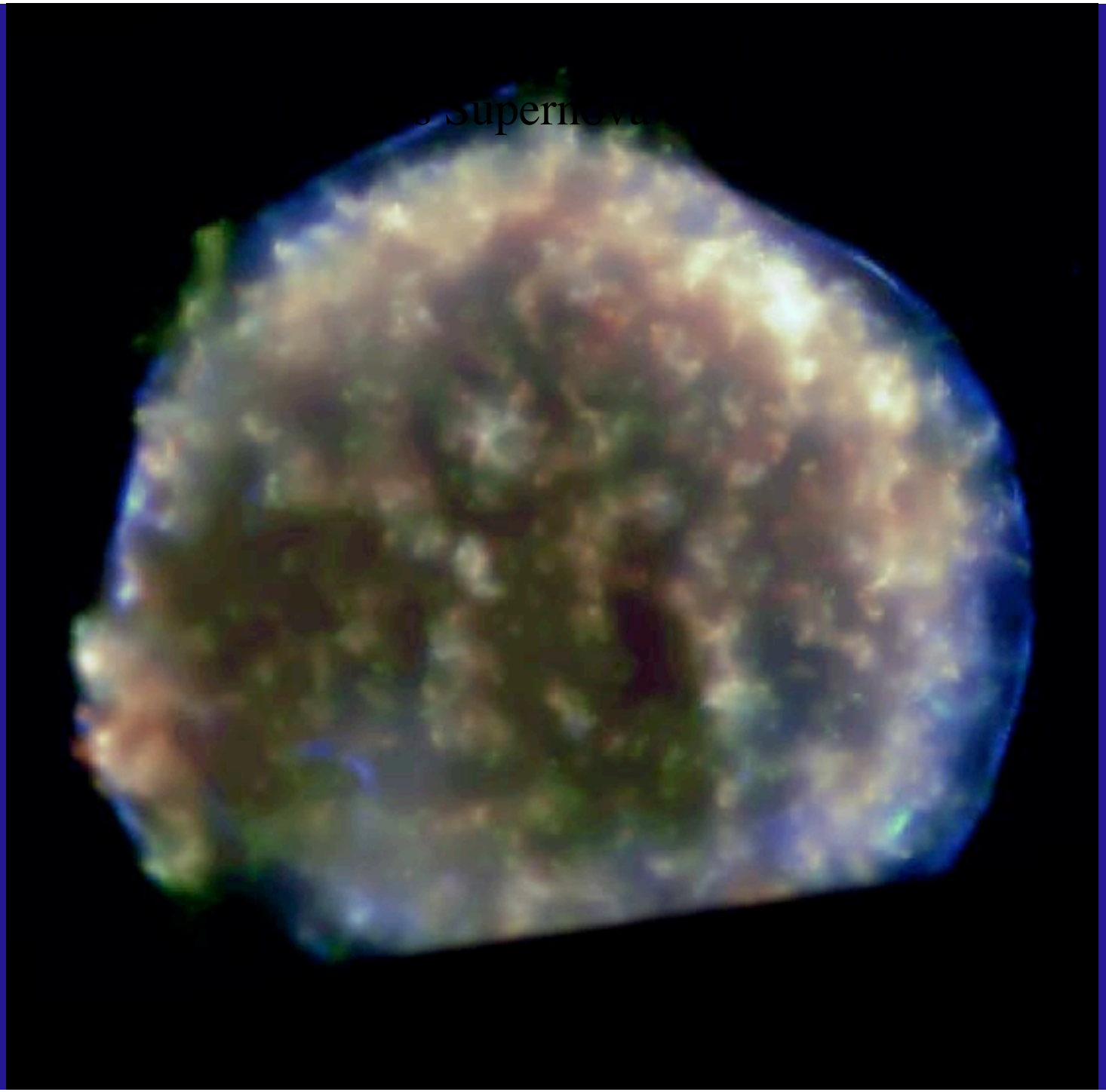
Optical Image

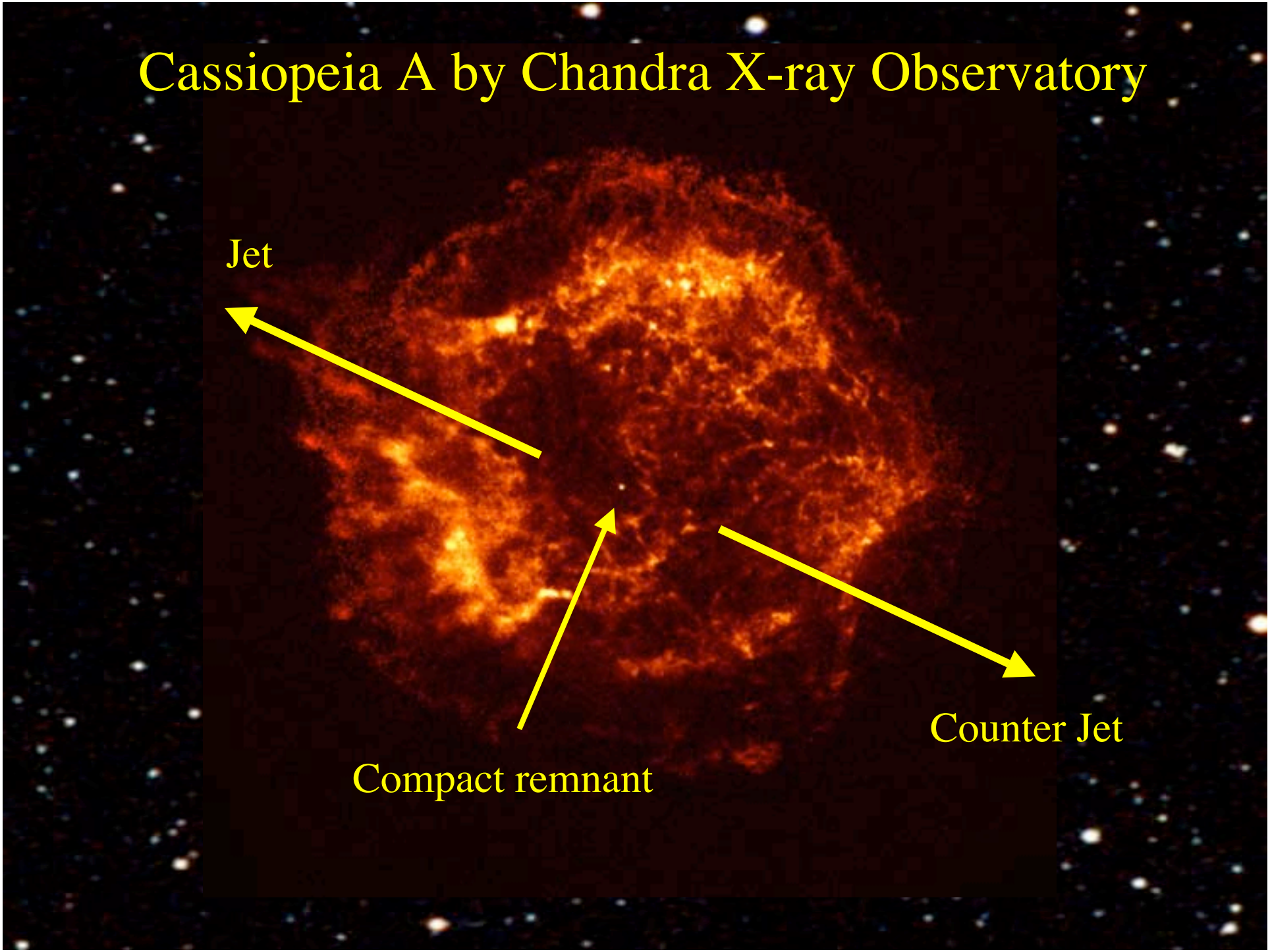
Chandra Observatory
X-Ray Image



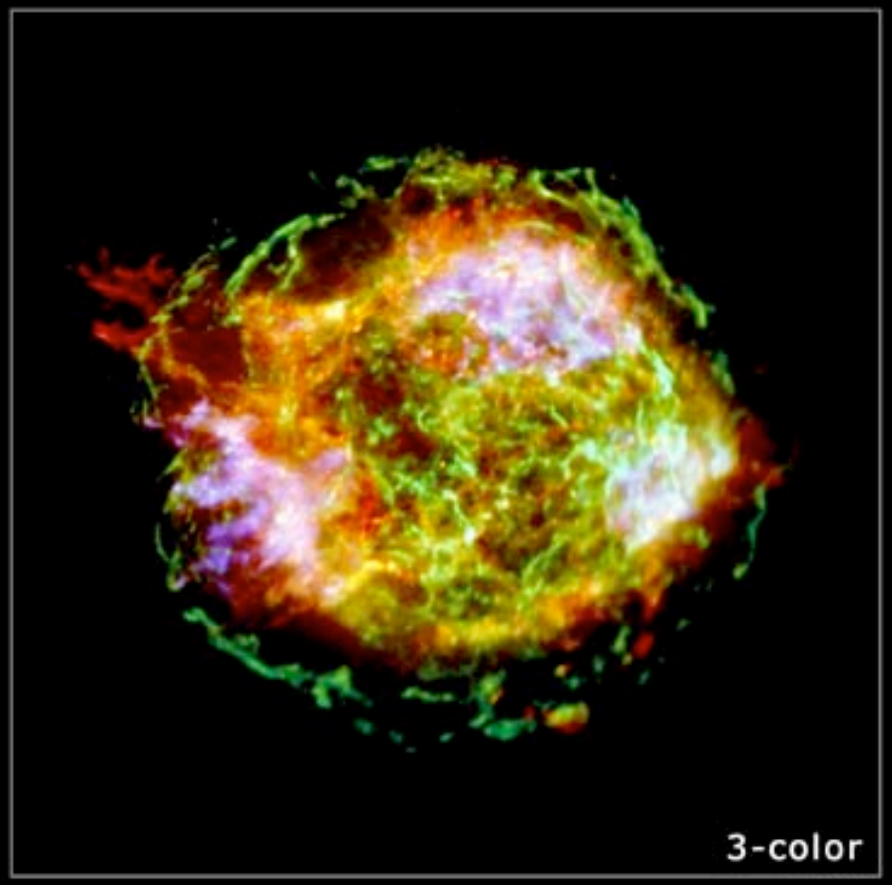
Left-over jet

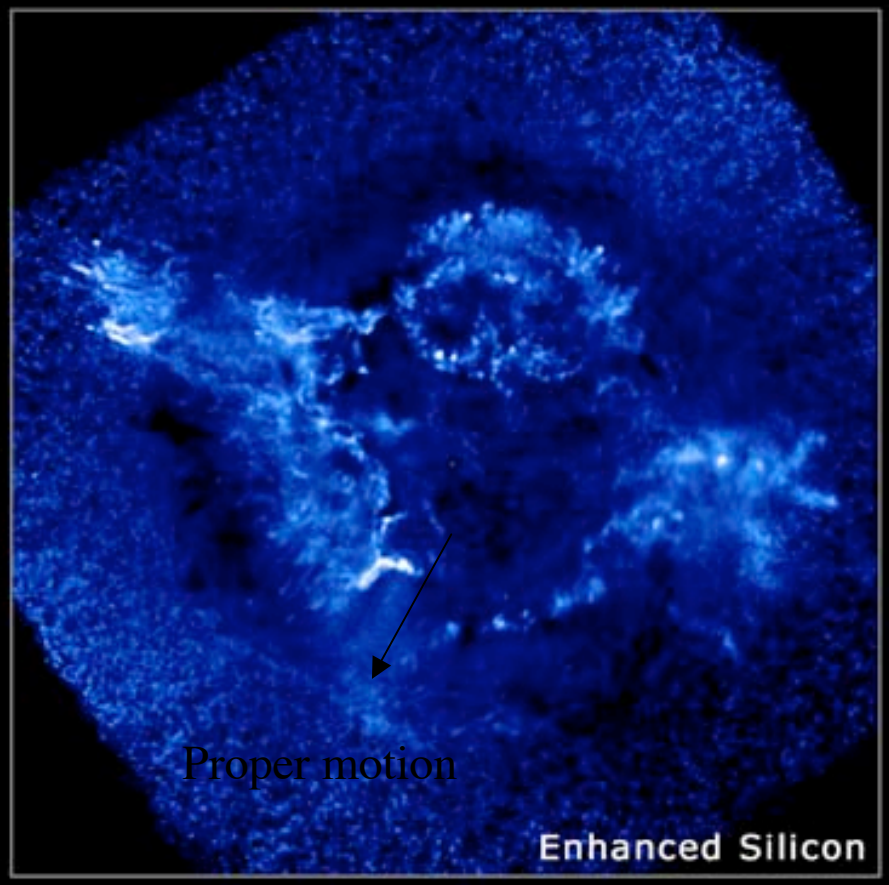

pulsar
axis/torus structure
motion




Cassiopeia A by Chandra X-ray Observatory
Jet
Counter Jet
Compact remnant

Recent Chandra Observatory X-ray Image of Cas A

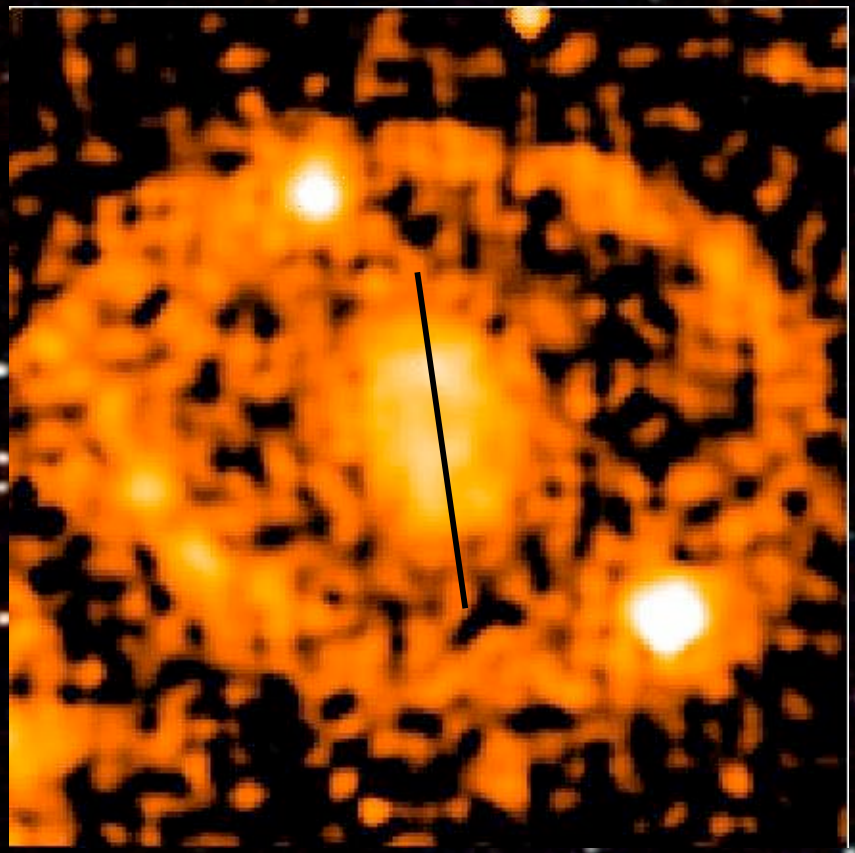


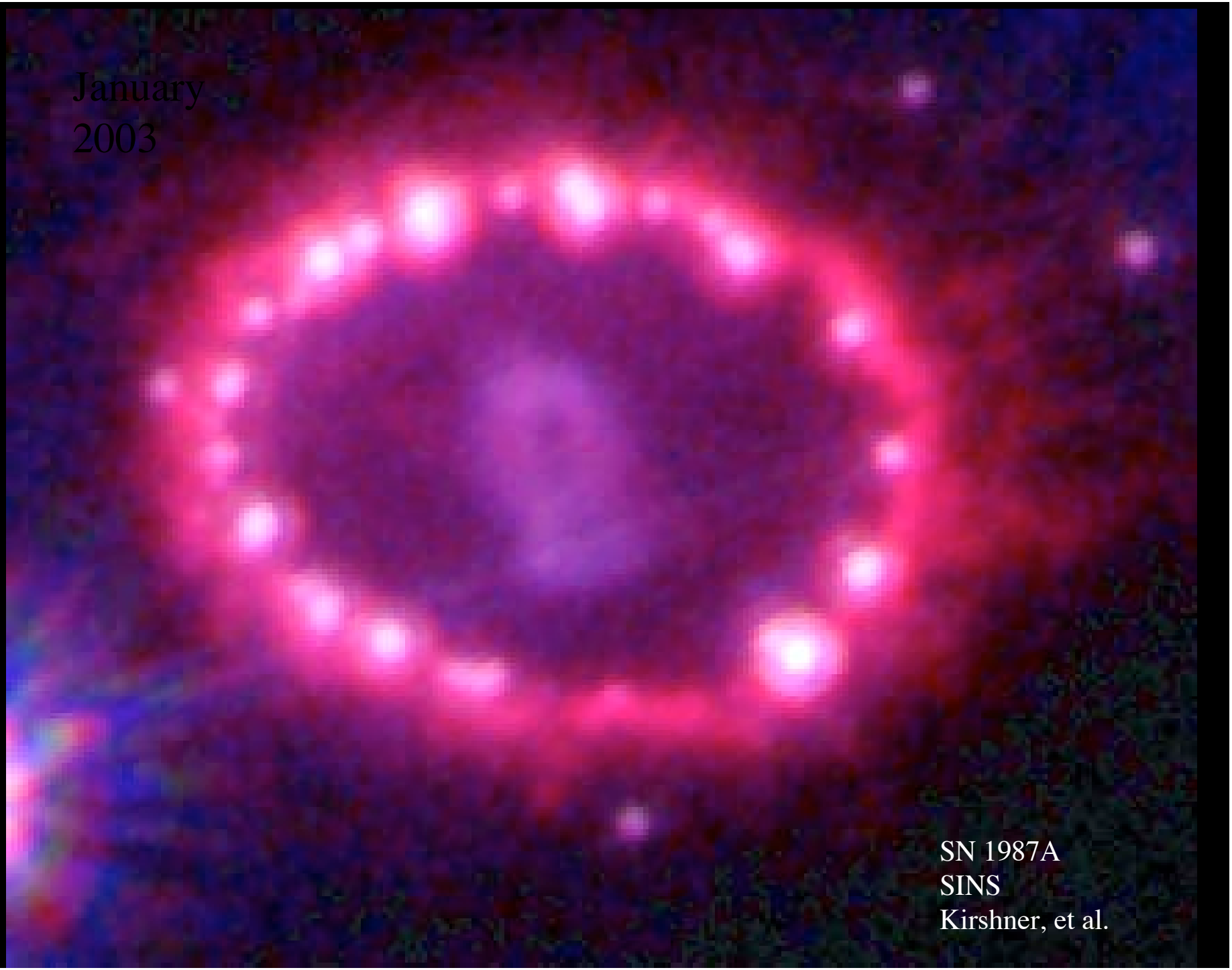


SN 1987A
Exploded in nearby galaxy

Bi-polar symmetry

Elongated debris




January
2003
SN 1987A
SINS
Kirshner, et al.


Vela Supernova
About 10,000 years old
89 ms pulsar
axis/torus structure
proper motion
aligned with axis

All SN since 1680, since invention of telescope, modern astronomy, have been discovered in other galaxies.

Our Galaxy is overdue for another!

It was recognizing (early in the 20th century) that some “novae” were in distant galaxies and hence were 10,000 to 100,000 times brighter than classical novae in the Milky Way that led to the recognition and naming of “super” novae.