

Cosmic Explosions

Fang Yuan

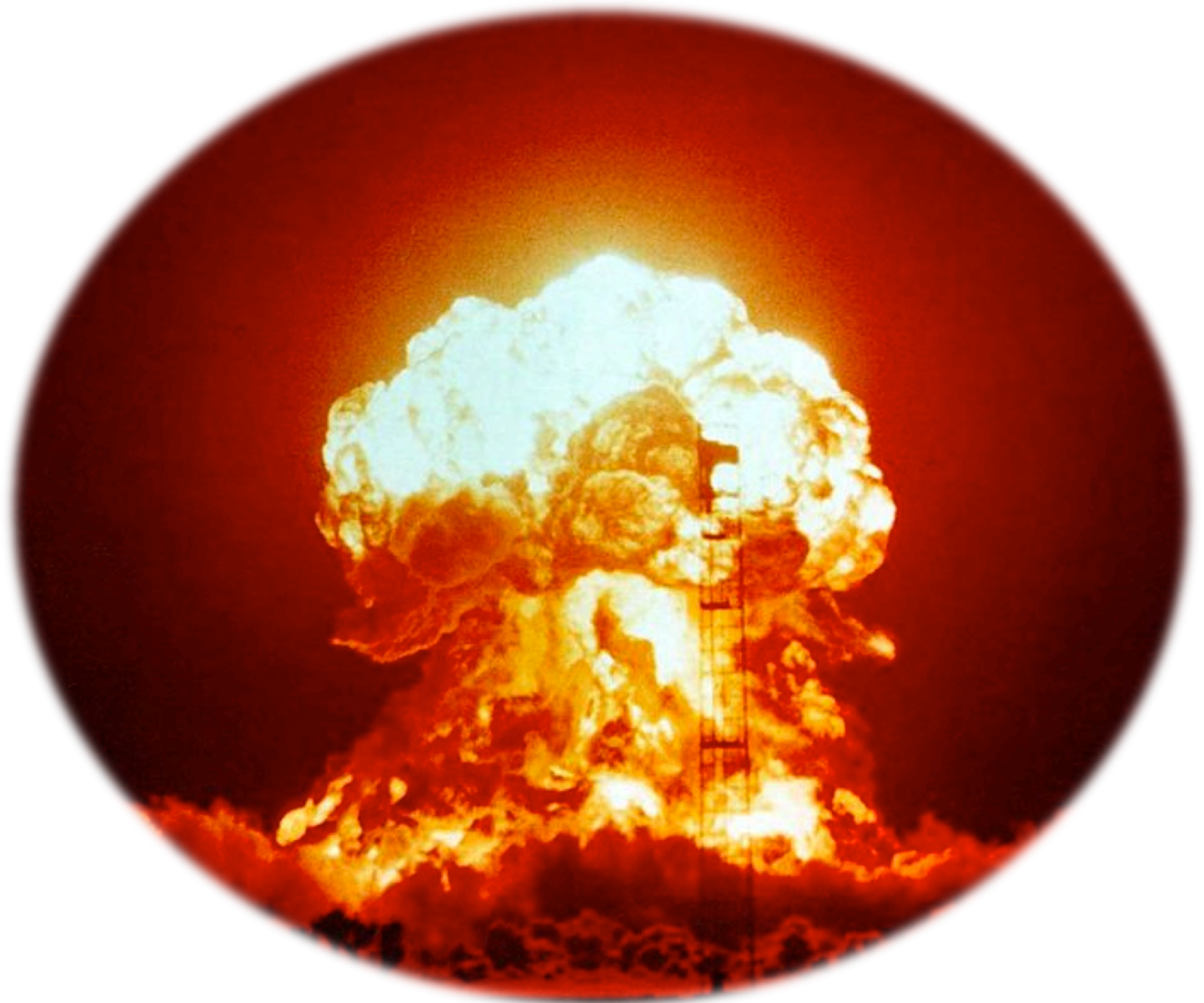


Australian
National
University



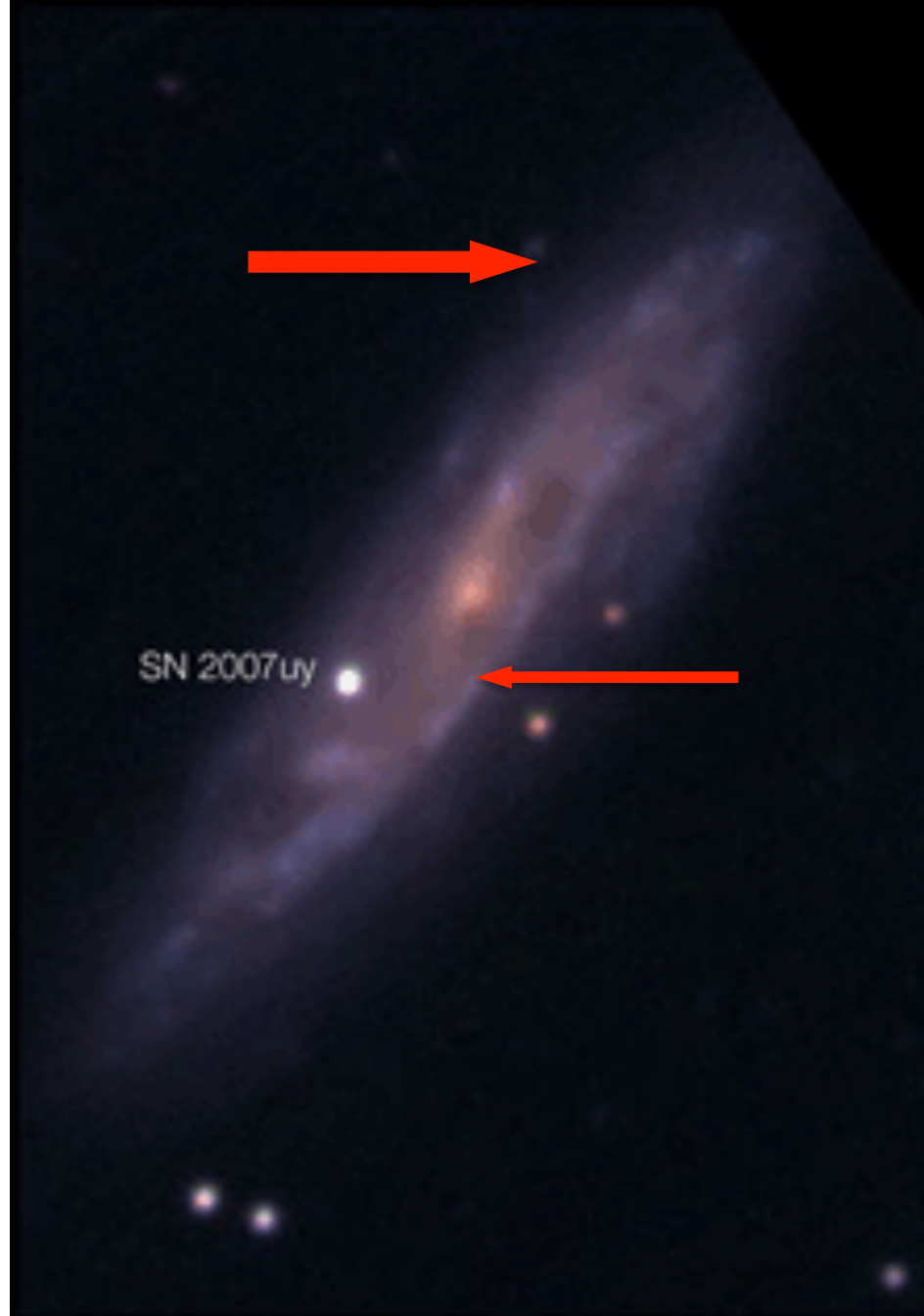
CAASTRO
ALL-SKY ASTROPHYSICS

What do we
observe?



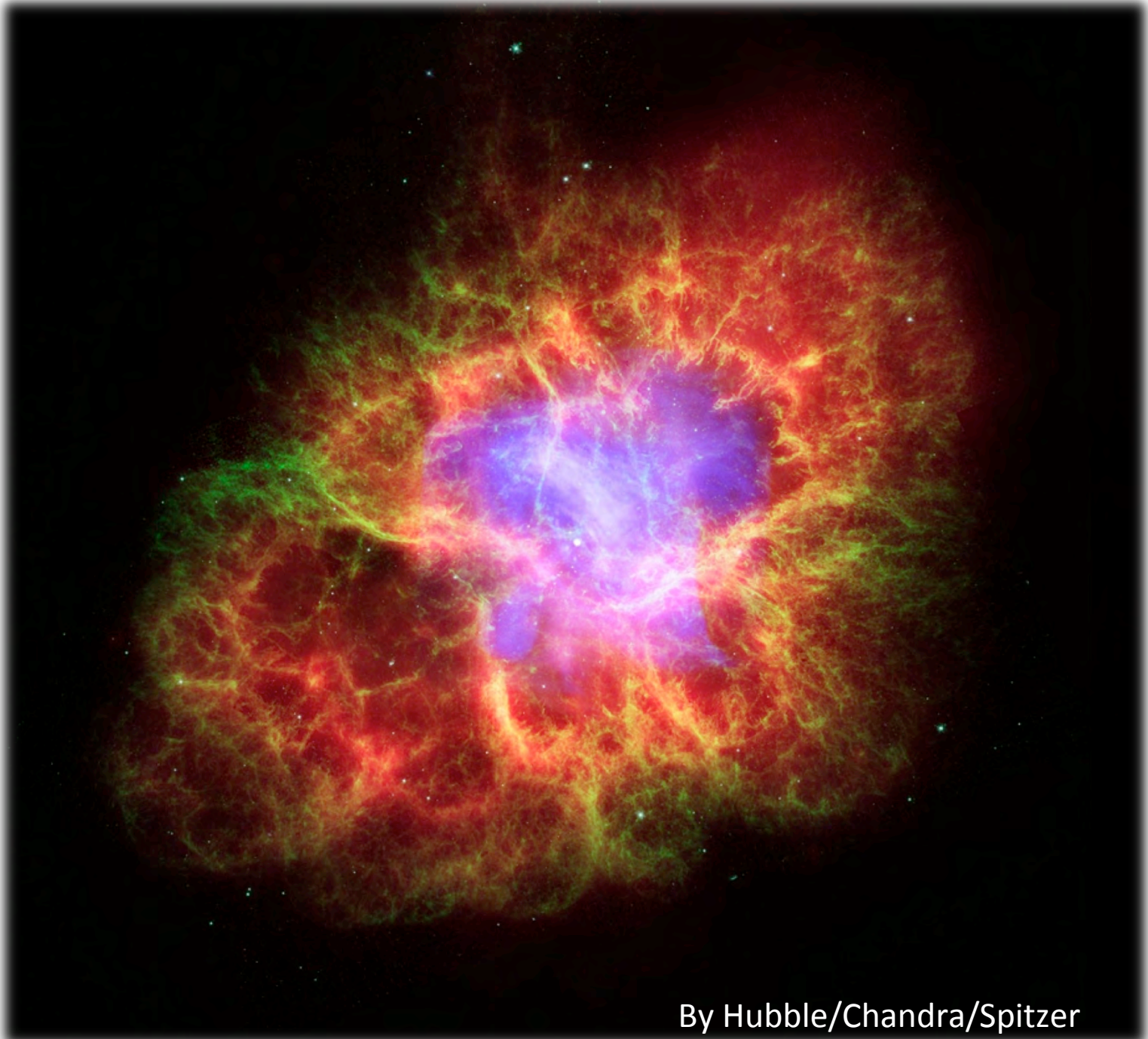


6 January 2008





Credit: **Davide De Martin**



By Hubble/Chandra/Spitzer

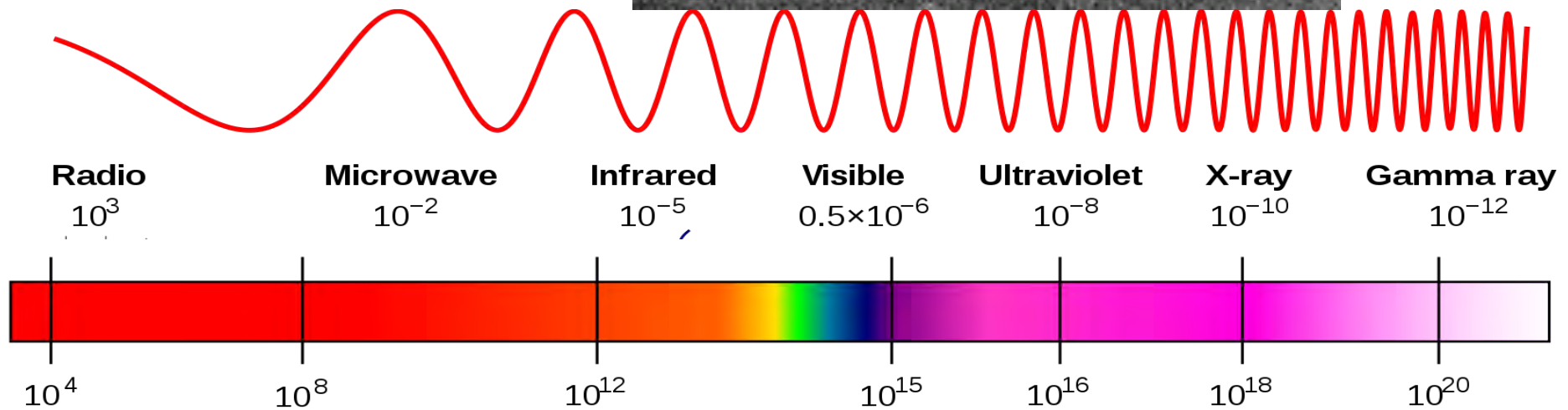
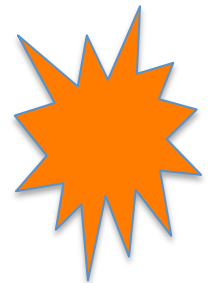
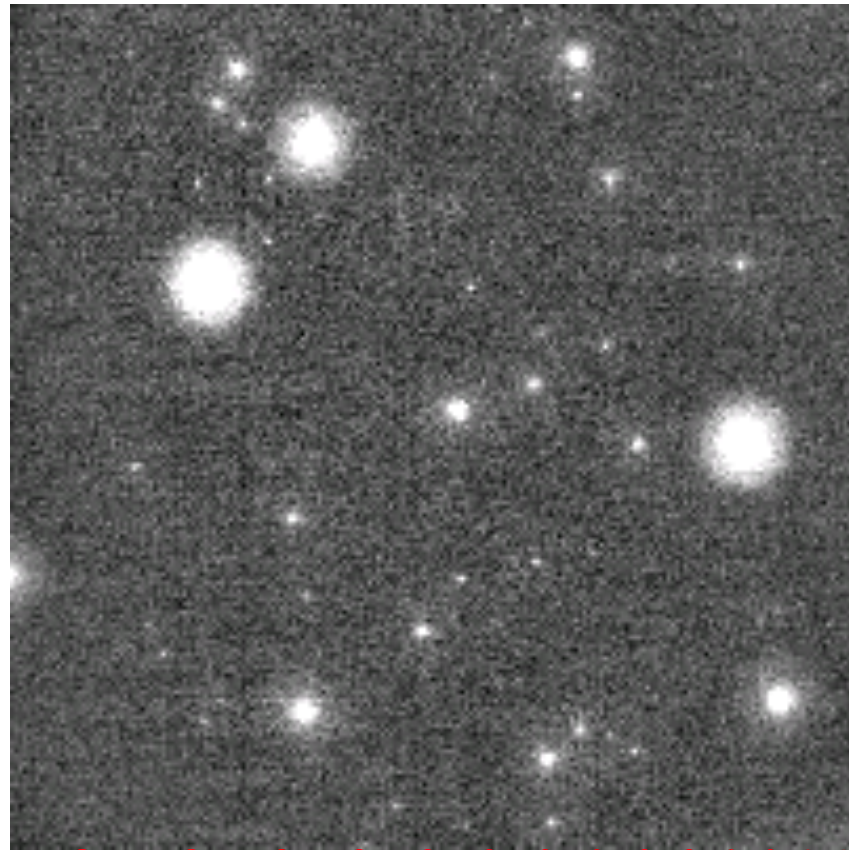
GRB 080319B

$Z \sim 0.94$

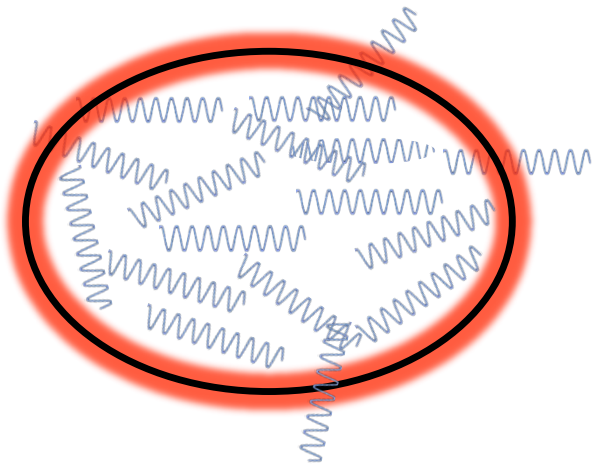
7.5 billion years ago

Visible by naked eye!

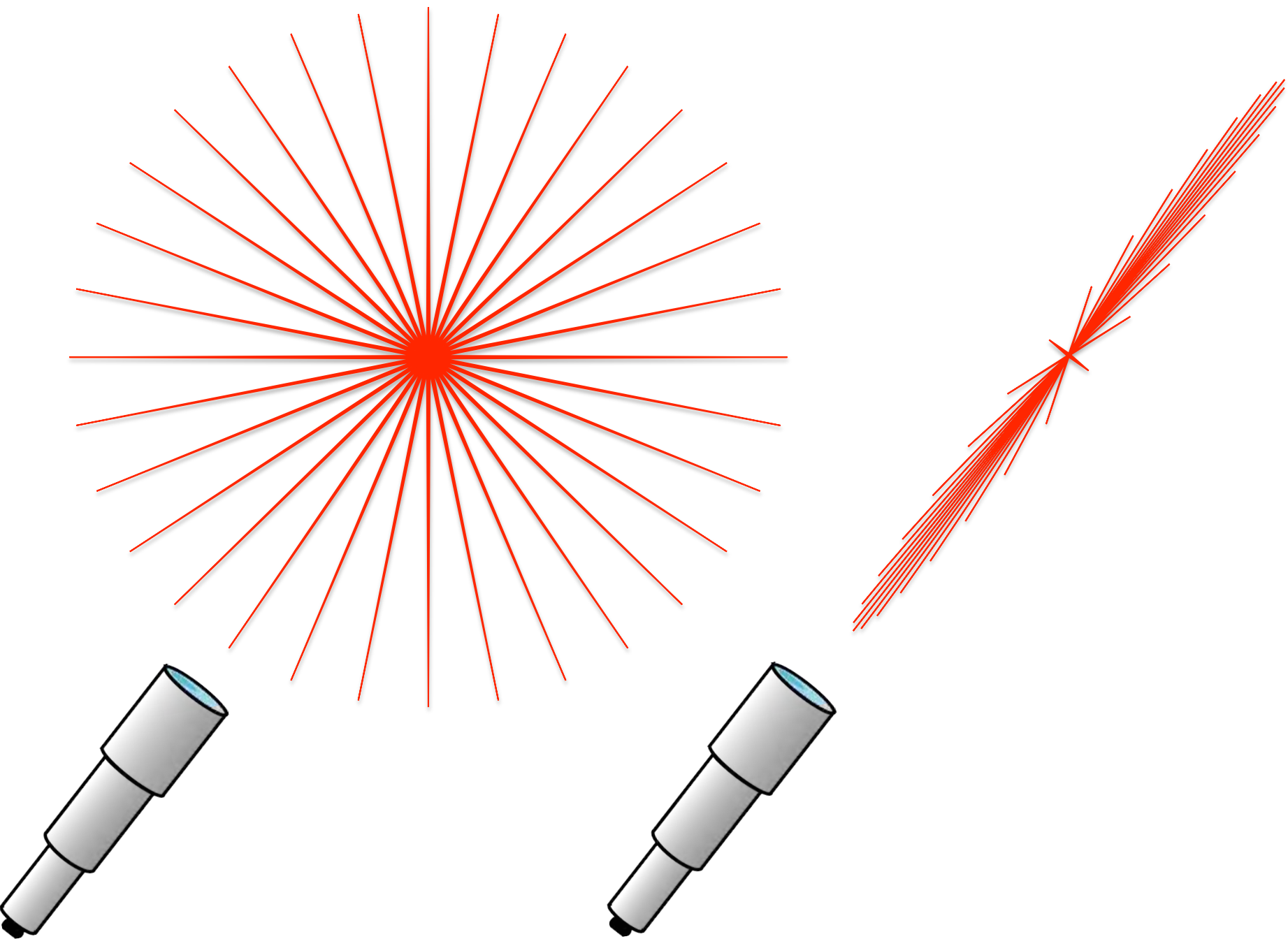
10^{17} brighter than our sun



Too much energy ?



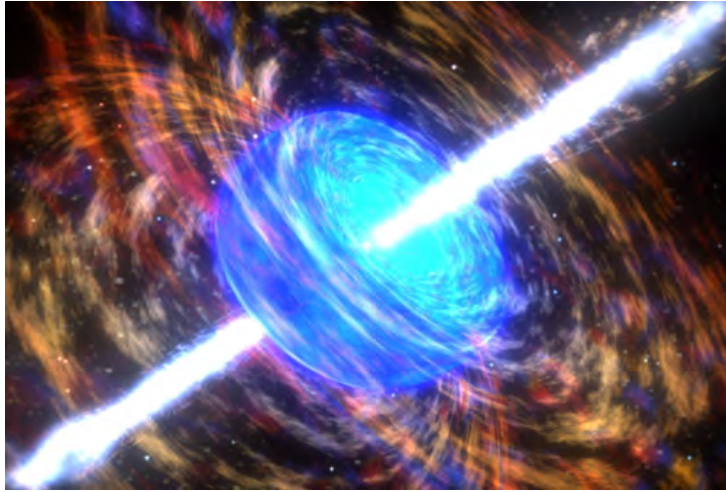
$v \sim 99.99 \% c$





http://www.nasa.gov/centers/goddard/mov/97789main_GRBstar2.mov

Gamma-Ray Bursts



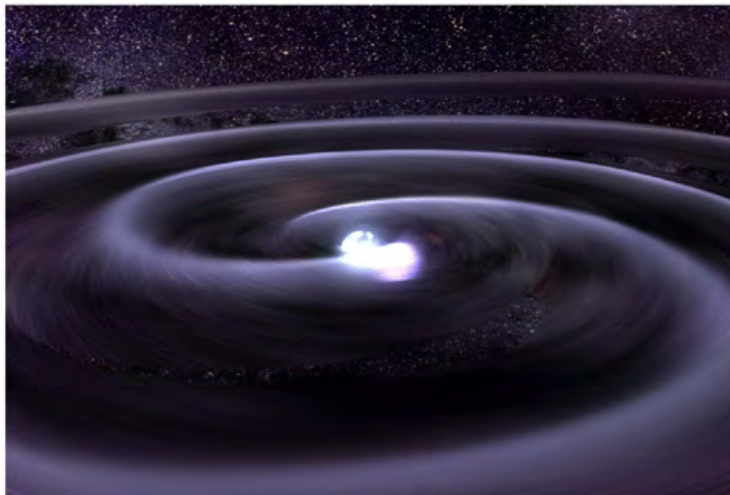
Massive Star

Supernovae



White Dwarf

Compact Merger



How do we
study them?

Robotic Optical Transient Search Experiment

ROTSE



FORT DAVIS

BAKIRLITEPE

MT. GAMSBERG

COONABARABRAN

The Sun Never Rises on the ROTSE Empire



Robotic Optical Transient Search Experiment

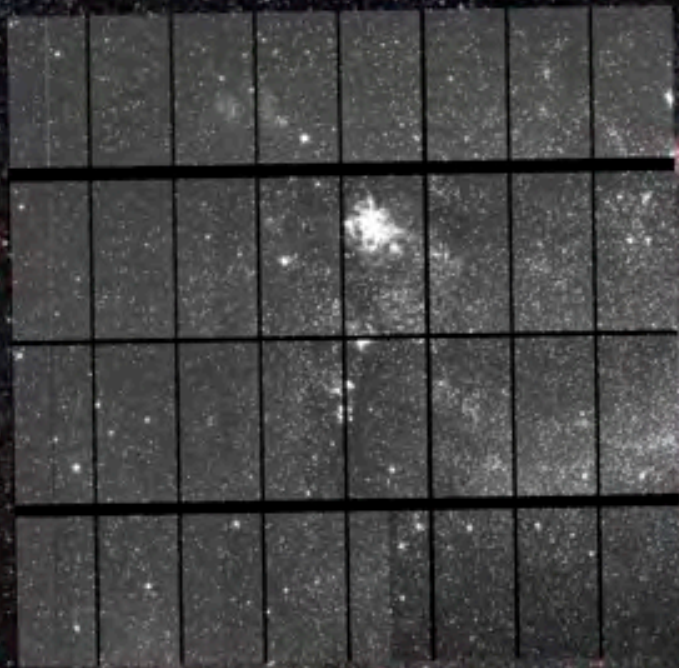
RO





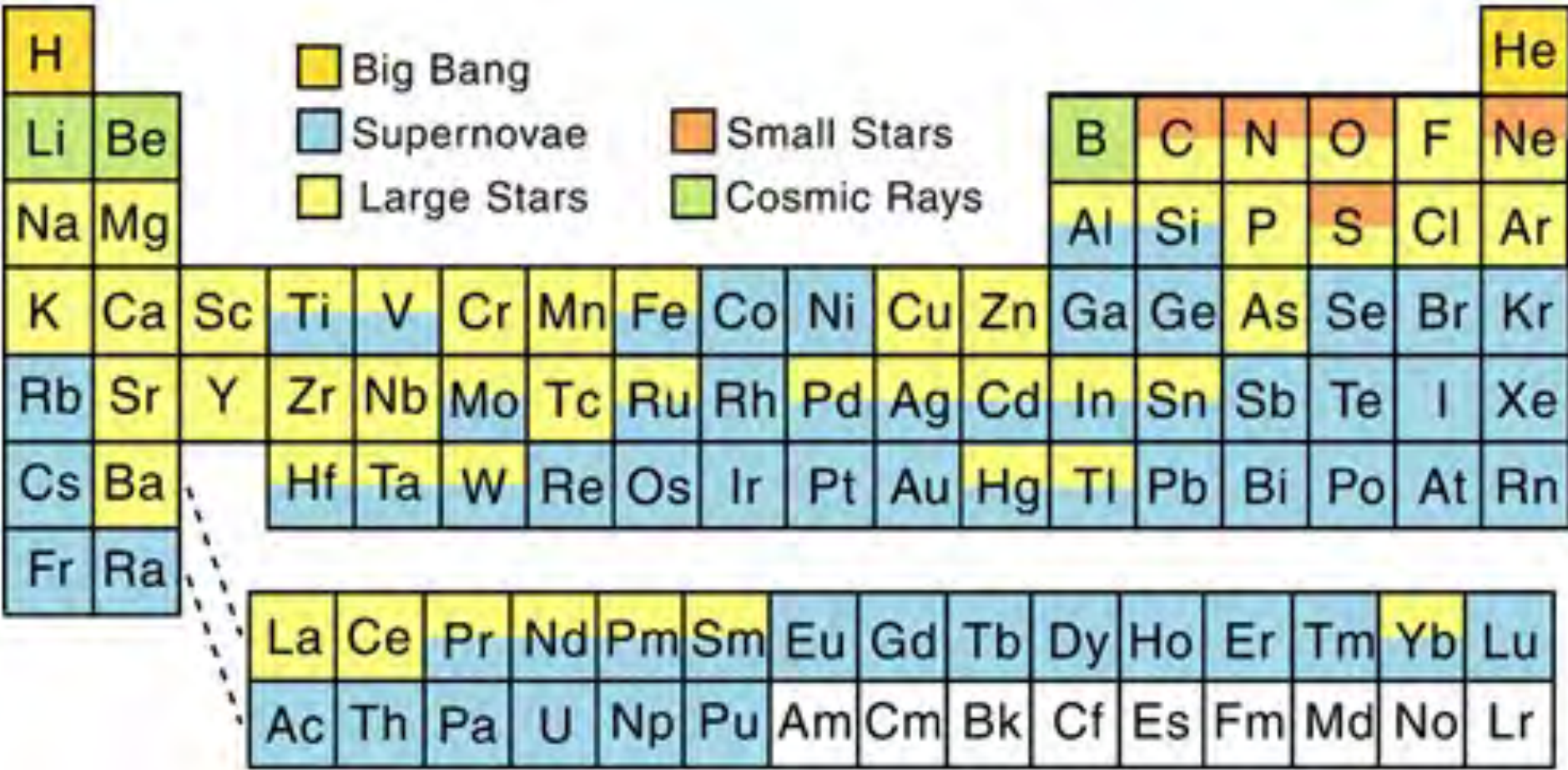
Skymapper @ SSO

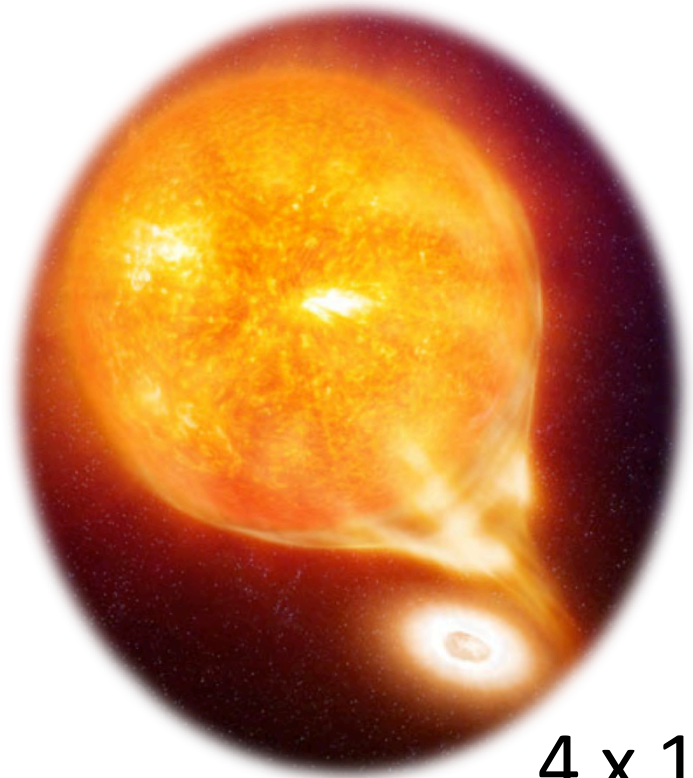




Why do we
care?

Extreme conditions





BANG!

3×10^{11} light year

520 million year

4×10^{10} light year

4.2 billion years

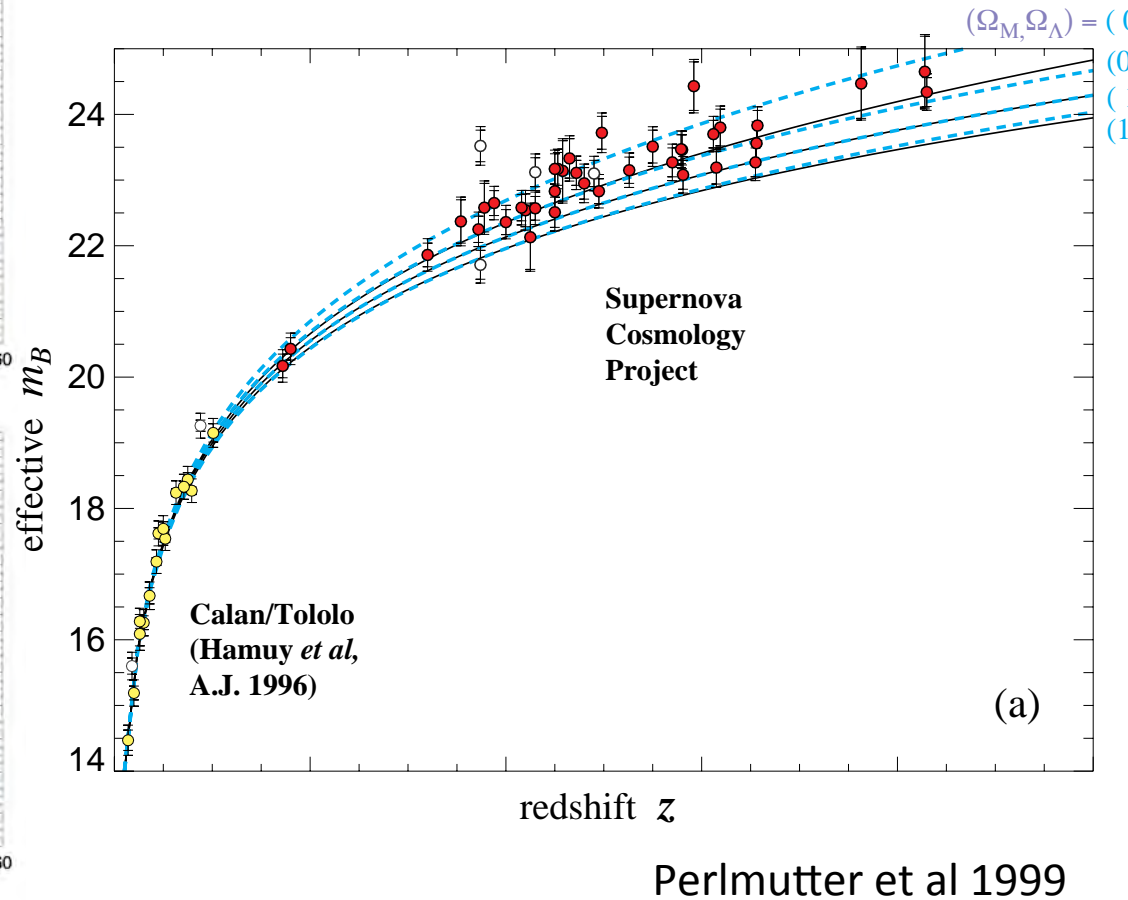
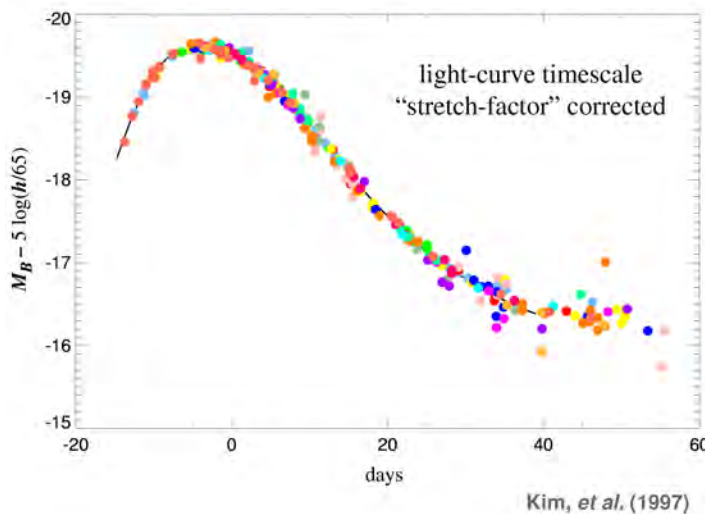
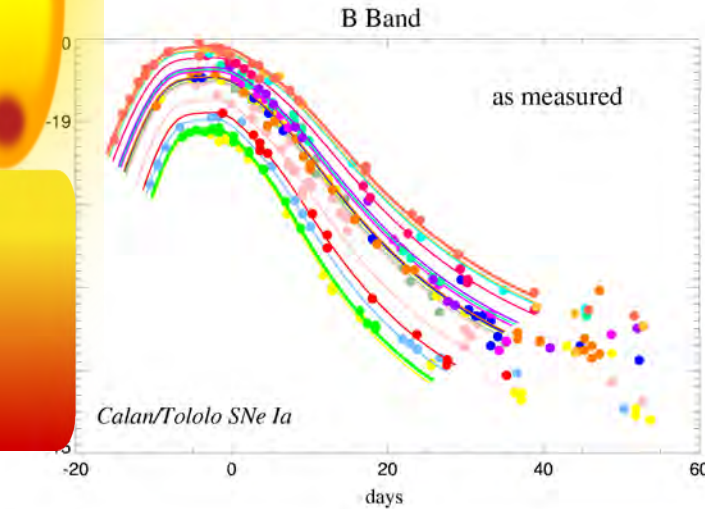
1 light year



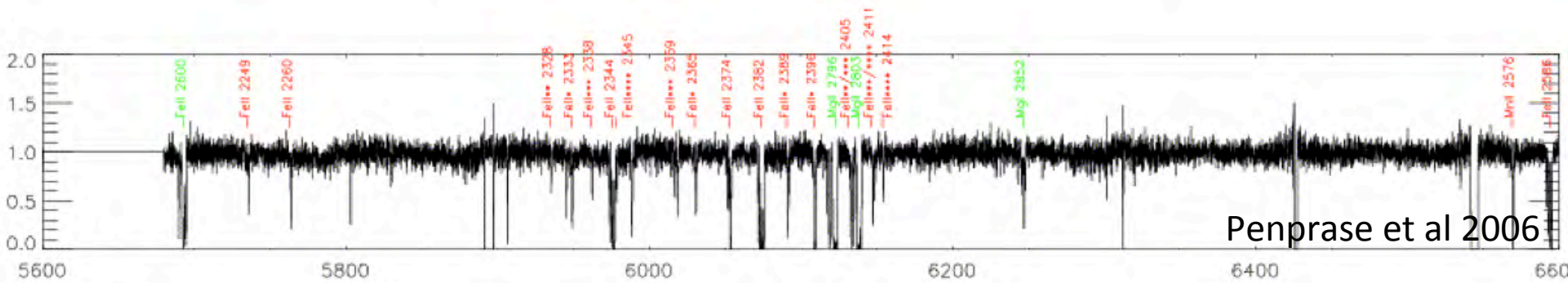
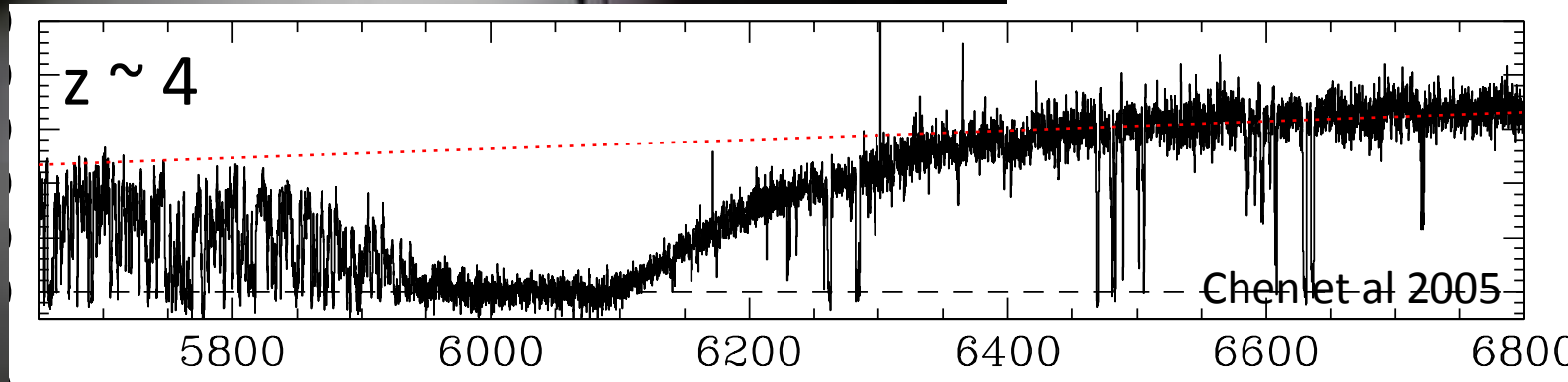
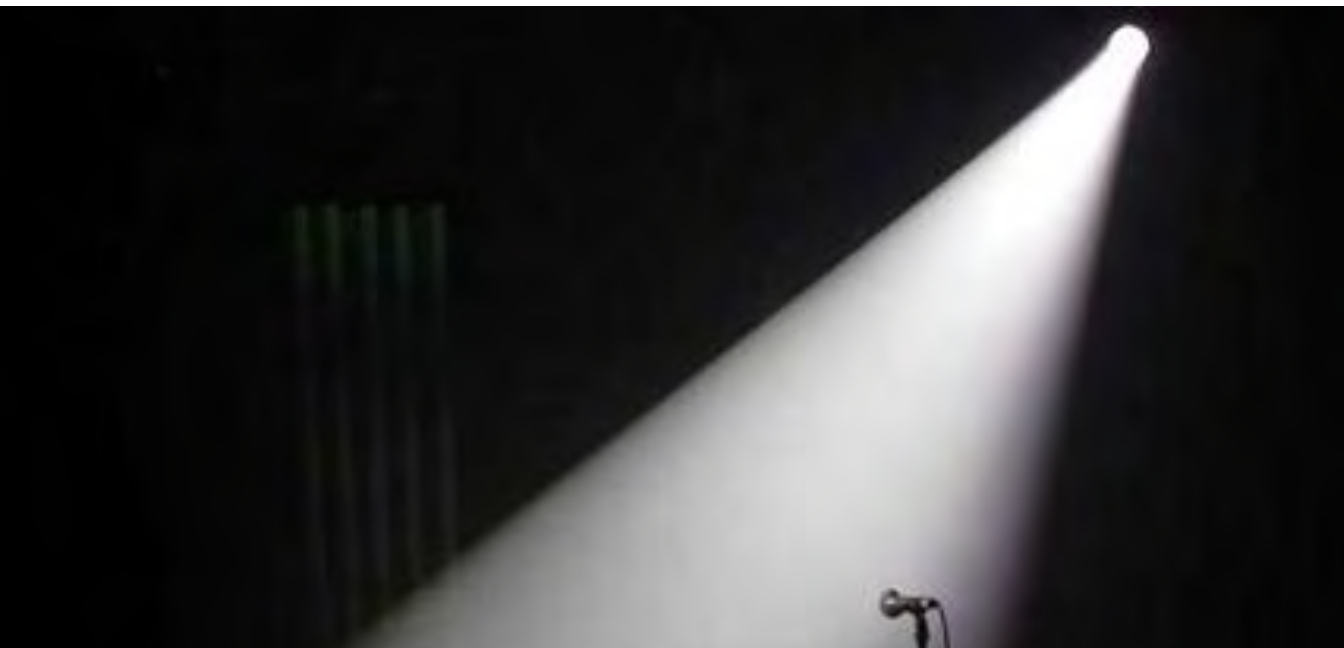
13.7 billion years



Hubble Diagram



(a)



Open Questions

GRB – SN connection

Better standard candle

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