

10/9/07

Reading - Chapter 6, 7

Astronomy in the news? Nobel Prize in Physics: quantum effect on magnetic fields, giant magnetoresistance, tiny disk drives, how Ipods work.

New Horizons mission, flies by Jupiter, detects lightning from poles.

Texas team discovers brightest supernova ever.

Pic of the Day - Iapetus



We have joined the U. of Michigan
RObotic Transient Source
Experiment (ROTSE) collaboration.

Four ROTSE telescopes around the
world. Texas, Australia, Namibia
and Turkey.

18 inch mirrors, 1.85 degree squared
field of view.



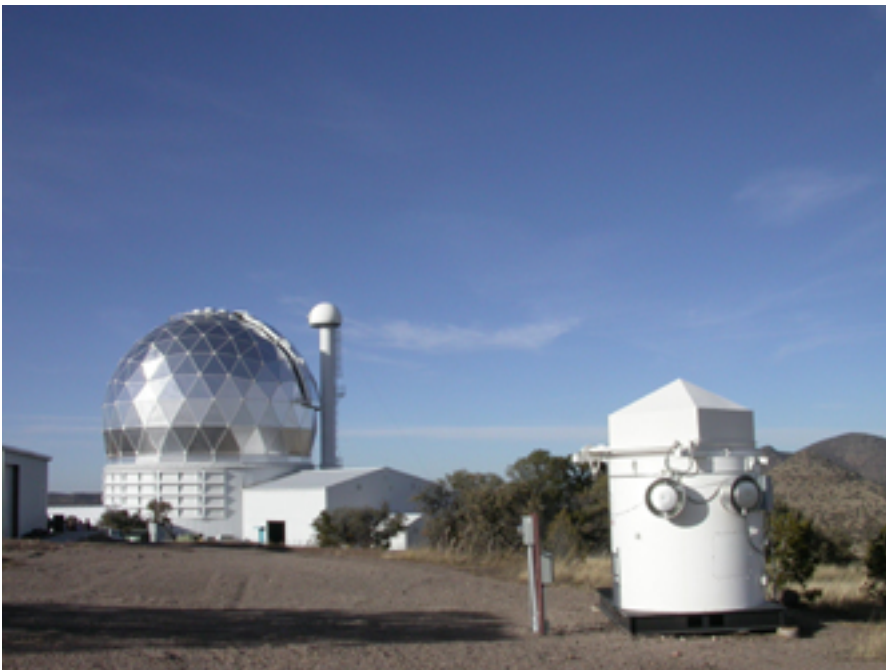
ROTSE can point and shoot within 6 secs
of electronic satellite notification, take
automatic snapshots every 1, 5, 20, 60 secs.

ROTSE has:

Discovered the optical transient ***during*** the
30 second gamma-ray burst;

Followed the light in unprecedented detail;

Relayed the discovery and coordinates to
the HET for spectroscopic follow up.



A New Type of Supernova

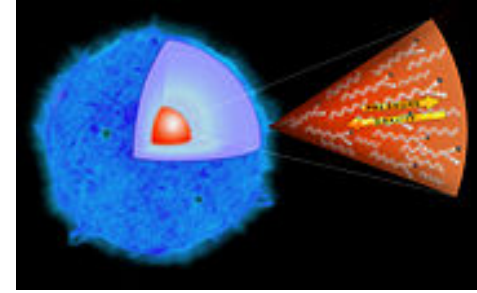
Texas graduate student, now Postdoctoral Fellow, Robert Quimby used ROTSE to conduct the *Texas Supernova Search*, covering unprecedentedly large volumes of space.

Quimby reported the intrinsically brightest supernova ever seen! (at the time, Fall 2006)

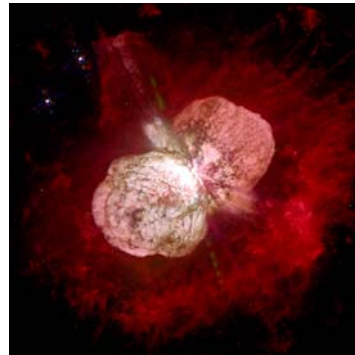
I proposed that it was yet a different kind of explosion, proposed theoretically 40 years ago, hypothesized to occur among the first stars ever formed in the Universe, but never seen.



A very massive star, more than 100 times that of the Sun, gets so hot that its radiation, gamma-rays, convert some energy to matter and anti-matter, specifically pairs of *electrons* and anti-electrons, otherwise known as *positrons*. This process makes the pressure decline, the oxygen core contracts, heats, undergoes thermonuclear explosion, totally disrupting the star, ejecting 20 solar masses of radioactive nickel-56: a *pair-formation supernova*.



One hypothesis:
The progenitor
resembled Eta
Carina



Quimby found, just reported, an even brighter supernova!

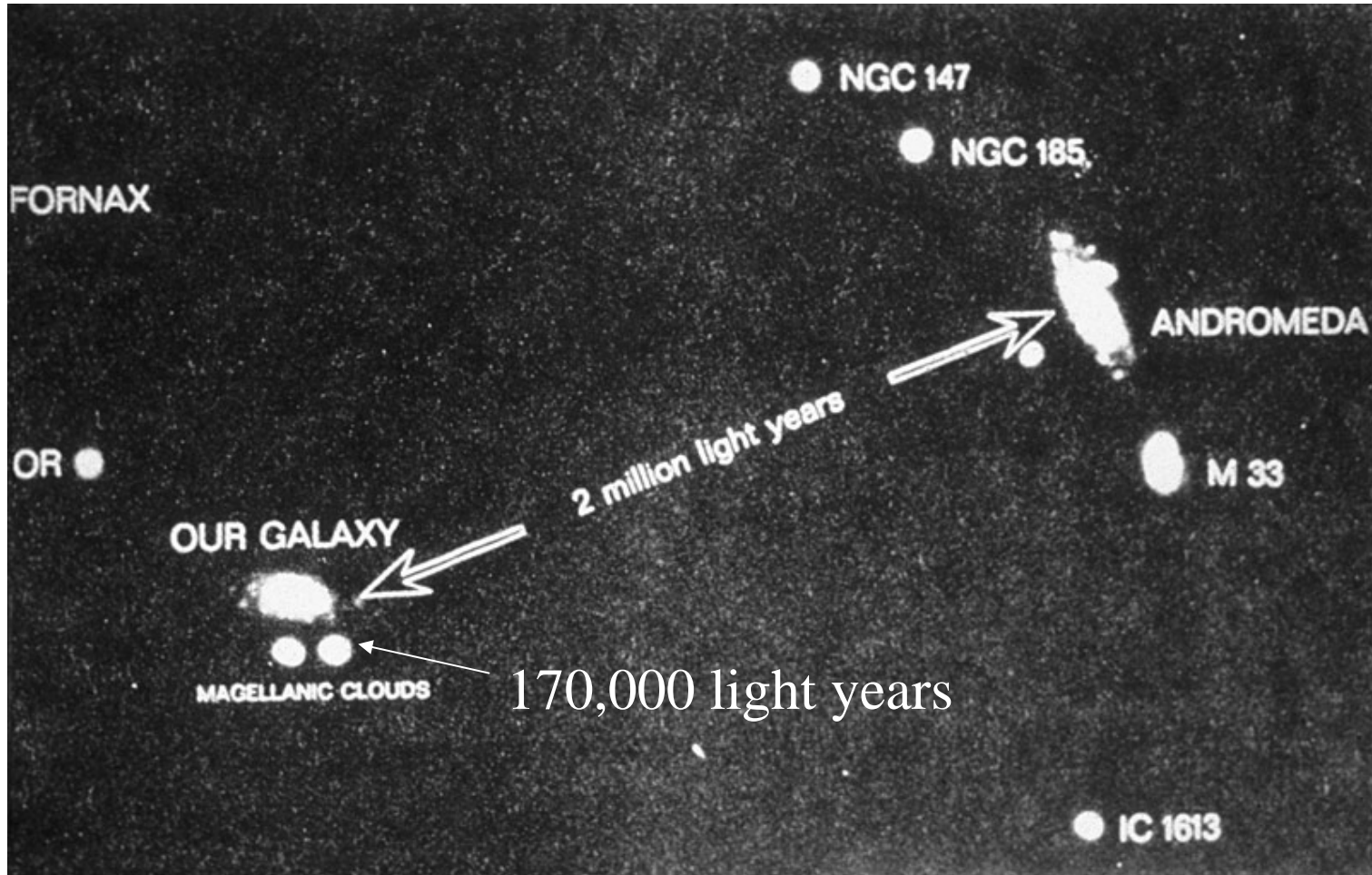
Kepler

SN 1987A

first naked eye
supernova since
Kepler's in
1604



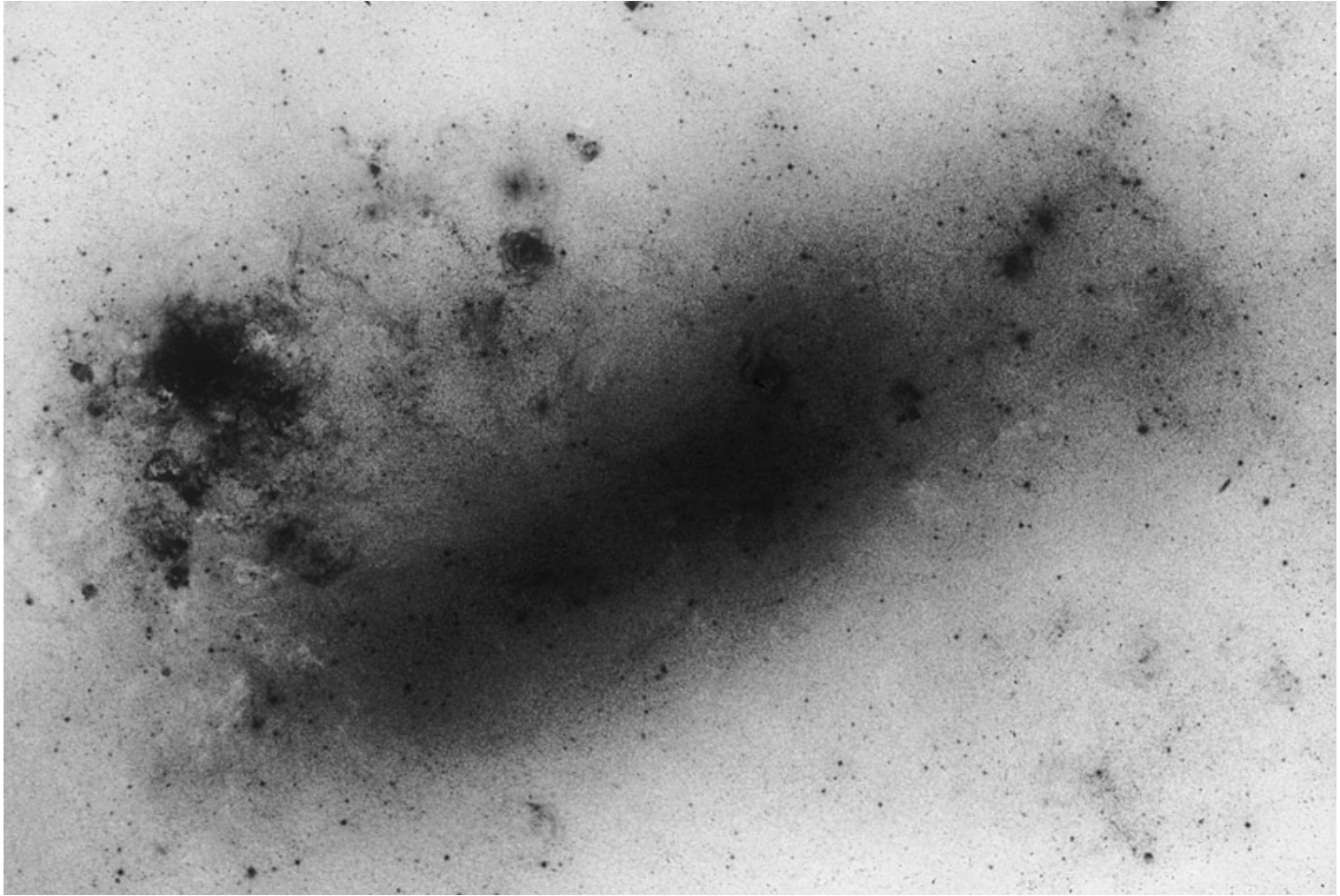
Local group



Large Magellanic Cloud, irregular galaxy (color)



LMC negative



Rob McNaught patrol photos - the day before



2-22-87

The first known photo of SN 1987A hours after shock breakout



2-23-87

One day later



2-24-87

Near maximum light



5-20-87

About when I saw it



8-23-87