Interpreting SN 2006gy from a Modified Ritzian Viewpoint

AAAS-SWARM
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- Swiss Physicst Walter Ritz's (1908) ballistic emission theory of electrodynamics was (and still is) the most serious competion to Einstein's (1905) Special Theory of Relativity (SRT).

- Ritz's theory was modeled on the Newtonian emission theory of light and dispensed with relativistic:
- time dilation,
- mass increases, and
- length contractions.

Walter Ritz

- "Recherches critiques sur
- l'Électrodynamique Générale,"
- *Annales de Chimie et de Physique,* **13**, 145, (1908).

- English Translation
- Critical Researches on General Electrodynamics
- http://www.shadetreephysics.com/crit/1908a.htm

- Russian Trans.
- http://ritz-btr.narod.ru/contents.html

Similarities

- Both theories held that light travels at *c* with respect to their sources.

Differences

- SRT postulates that all uniformly moving observers measure a constant speed of light regardless of source to observer relative velocity.
- $c' = c$

Differences (Cont.)

Ritz's theory postulates that the relative velocity between source and observer affects an observer's measurement of light velocity.

$$c' = c+v$$

Said in another way…

- Where $c' = c + kv$
- Einstein would have $k = 0$
- Whereas Ritz would have $k = 1$

- Many tests have been done to determine value of *k*.

Problems

- Einstein required changing our classical ideas about time, distance to make his $k = 0$.
- Ritz's k=1 doesn't work in dispersive media because of extinction.*

- *Extinction, as used here, needs defining.

Ritz Problems

- Ritz's emission particles were not affected by interactions with charges in a medium. (No absorption or scattering events)
- Ritz died in 1909 at age 31 and didn't get to work the details of how the real world affected his emission particles.

John Fox's (1965) Extinction Theorem

When a light wave sets into motion the charges in a medium; these in turn emit new waves whose centers move in vacuum with the velocity of the charges of the medium.

J.G. Fox, "Evidence Against Emission Theories," *Am. J. Phys*., **33**, 1 (1965), p. 4

Limitations on Ritz's Relativity

- According to Fox the extinction distance for visible light in earth's atmosphere at sea level is about 0.3 cm, and in local interstellar space it should be about one light year.
- If Fox is right, then Ritz's relativity may work on microscopic (nano) scales or for modest distances in the near vacuum of space.

- Extinction is an exponential function.
- Five extinction lengths in a medium and the original energy may be considered as being completely replaced.
- Extinction length is inversely proportional to wavelength. UV or X-rays, etc., travel further than visible light before extinction completes itself.

According to Robert Shankland (1950), Einstein once considered an emission theory of light, similar to Ritz's theory (during the years before 1905) but he abandoned it . . .

- …because he could think of no form of differential equation which could have solutions representing waves whose velocity depended on the motion of the source. . . .

In this case the emission theory would lead to phase relations such that the propagated light would be all badly "mixed up" and might even "back up [time-wise] on itself".

***

It can be shown that this apparent weakness can be an advantage in understanding variable stars.

Ritz rejected Maxwell's Systems of Partial Differential Equations

- According to Ritz

- The equations represent stresses and elastic deformations in the "non-existent" solid ether.
- They allow the future to affect the present.
- They are fundamentally inappropriate to express the comprehensive laws of electrodynamics.

- Getting back to Einstein’s problem with “badly mixed up light.”

According to Ritz…

If [a radiating point] P' has an oscillatory movement, and if the distance PP' is sufficiently large, ...

it is possible that the waves starting at moments t'(1), t'(2), ...

where the speed of P' had different values v'(1), v'(2), ...,

will arrive at P simultaneously.

In 1913 Willem de Sitter, a collaborator with Einstein, sought to bury Ritz's ($c+v$) relativity with his well known "binary star" argument.

In 1913 he published the following four papers to that end. (Two in German and two in English)

- Ein astronomischer Beweis für die Konstanz der Lichgeshwindigkeit (An Astronomical Proof for the Constancy of the Speed of Light)

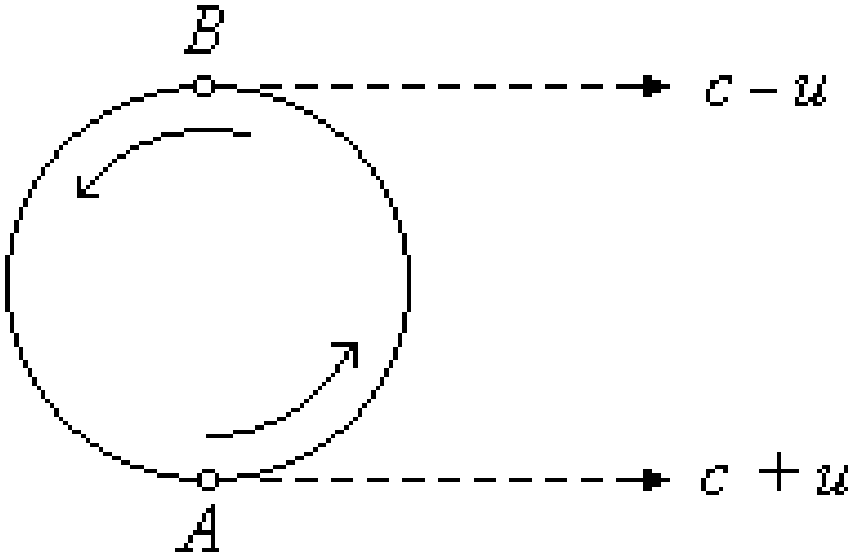
- Über die Genauigkeit, innerhalb welcher die Unabhängigkeit der Lichtgeschwindigkeit von der Bewegung der Quelle behauptet werden kann.
- (About the Accuracy Within Which the Independence of the Speed of Light From the Movement of the Source Can be Stated)

- A Proof of the Constancy of the Velocity of Light
- On the Constancy of the Velocity of Light

Copies of these papers, and their English Translations, are available online at:

http://www.shadetreephysics.com/desitter.htm

De Sitter's "Binary Star" Argument



$$\frac{L}{c-u} = T + \frac{L}{c+u}$$

The arrival time distortions would lead
To departures from Keplarian motions
Which have never been observed.

Hence Ritz's theory was to be abandoned.

And it mostly was, for nearly 75 years.

DeSitter didn't address *c+v* induced starlight intensity variations…

but…

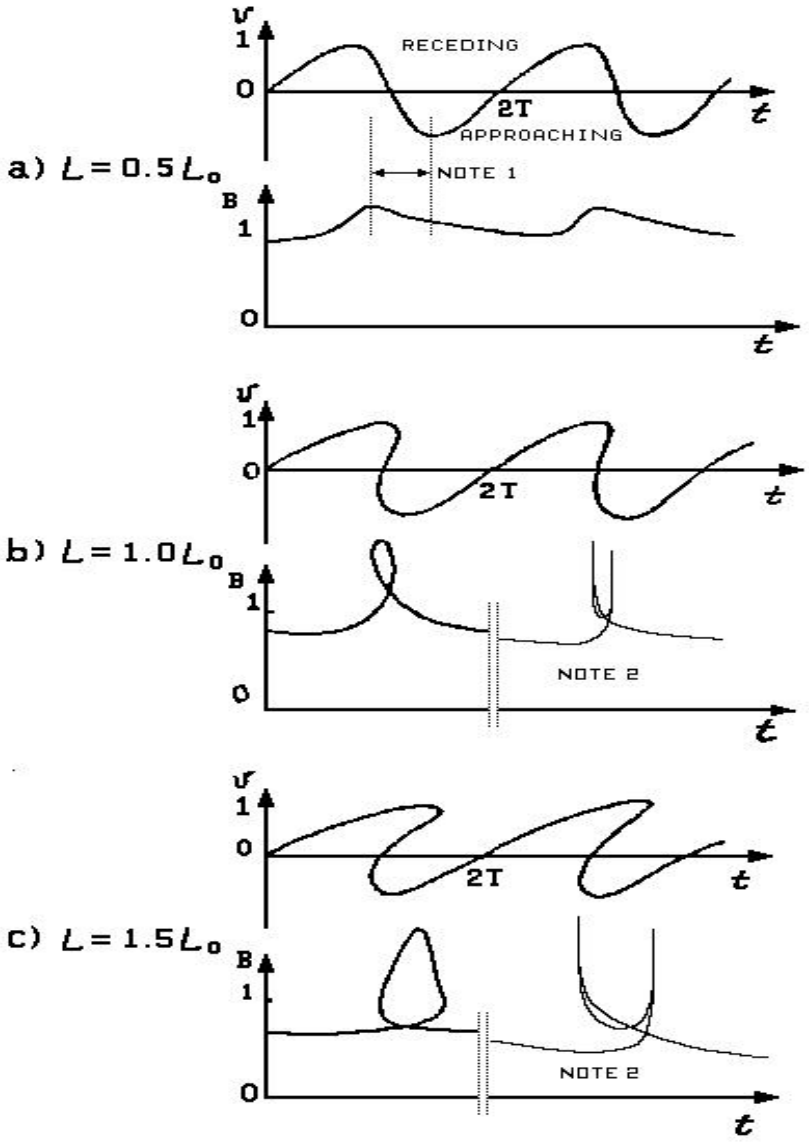
Where the faster light (from the approaching side of the orbit) catches up with the the slower light (from the receding side of the orbit) you could see a star on both sides of it's orbit simultaneously.

Vladimir Sekerin 1987

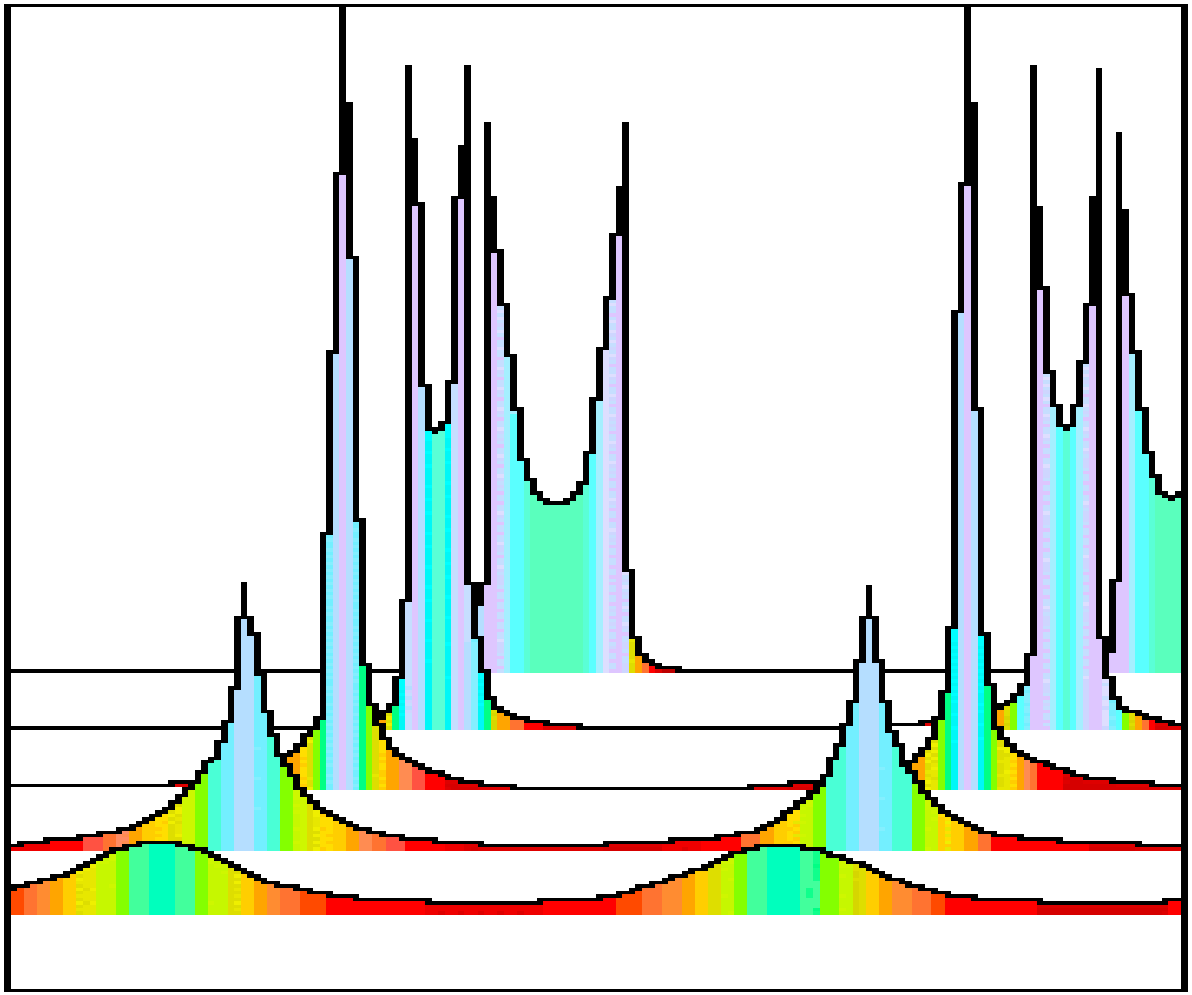
- Typical overtaking distances are so great that an observer cannot resolve the simultaneously arriving images.
- Two superimposed stellar images would be brighter than a single image.
- Thus, stars that are periodically varying in brightness may be irresolvable binaries.

- http://www.datasync.com/~rsf1.sekerin.htm

Sekerin's Brightness and Apparent Radial Velocity Curves



Binary Star Light Curves based on de Sitter's argument against Ritz (Sekerin 1988)



De Sitter's Whimsical Images

- Cepheid variables
- Crab Pulsar
- Geminga
- SN 1987a
- SS 433
- SN 2006gy

Supernova SN 2006gy

- Billed as most powerful supernova
- In Galaxy NGC 1260(?)
- Next image is a
- Blink Comparator using
- Lick IR image
- Chandra X-ray image

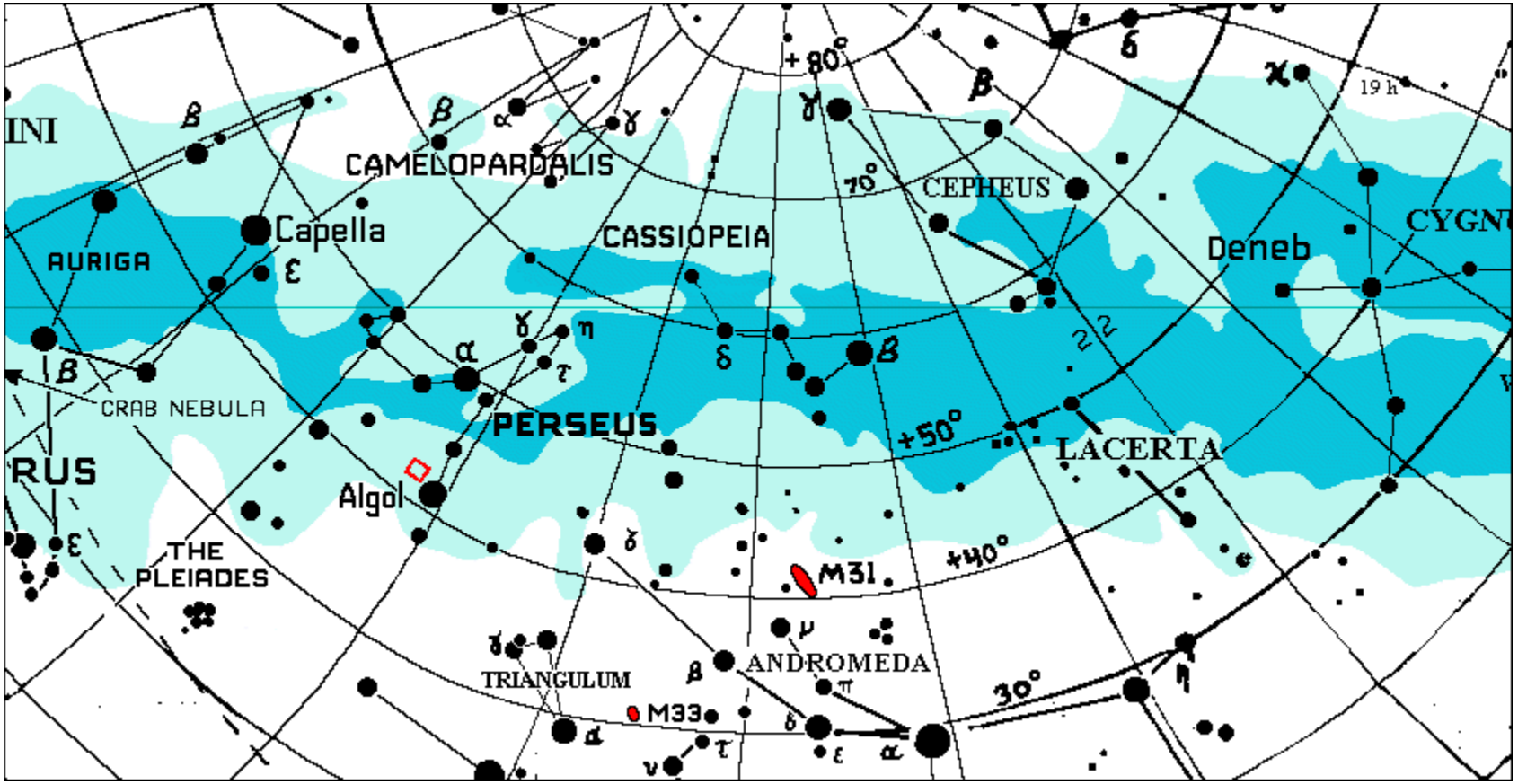
SN 2006gy

Lick IR

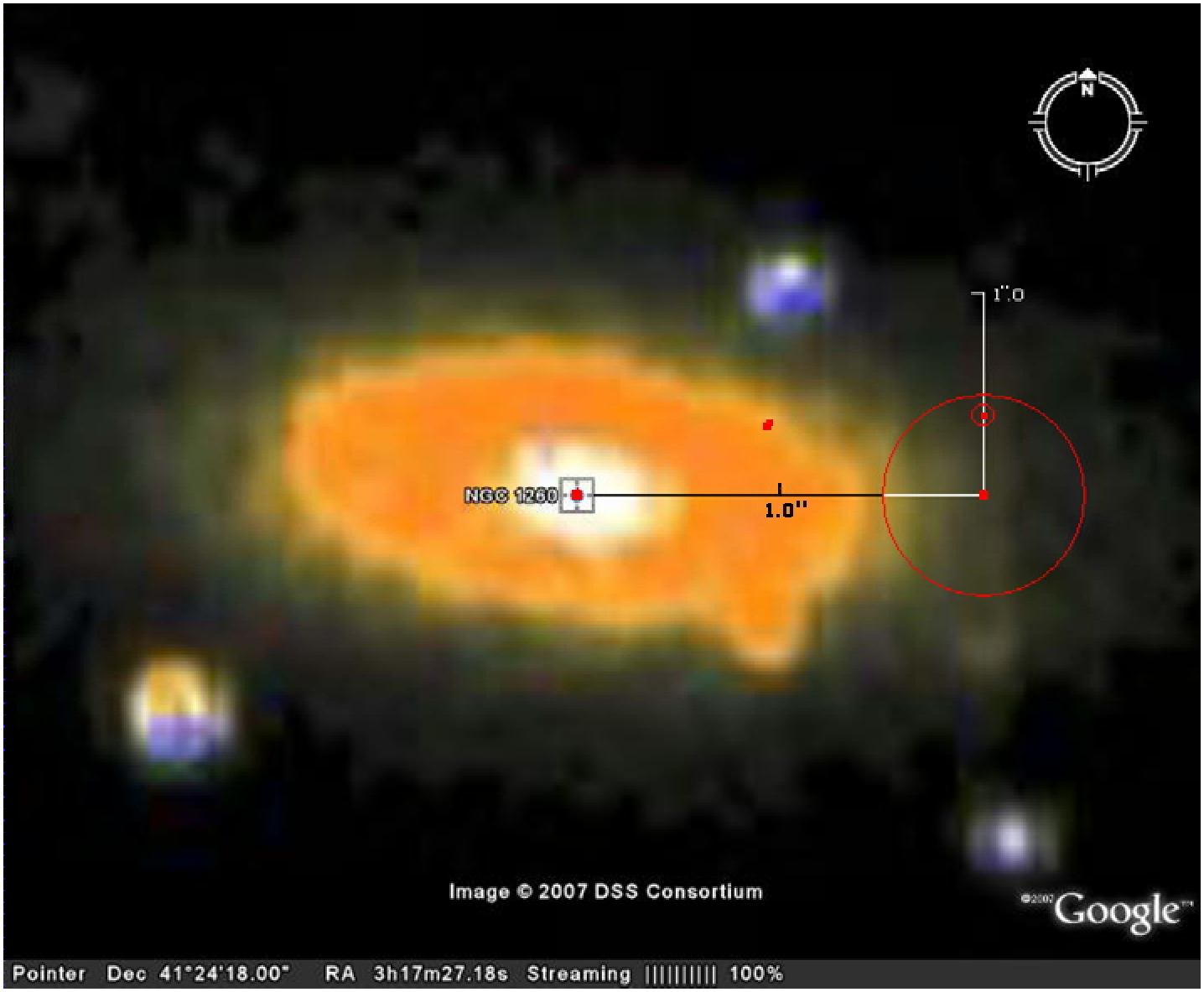
Chandra X-ray

These were shown as a gif animation blink comparator at the conference.

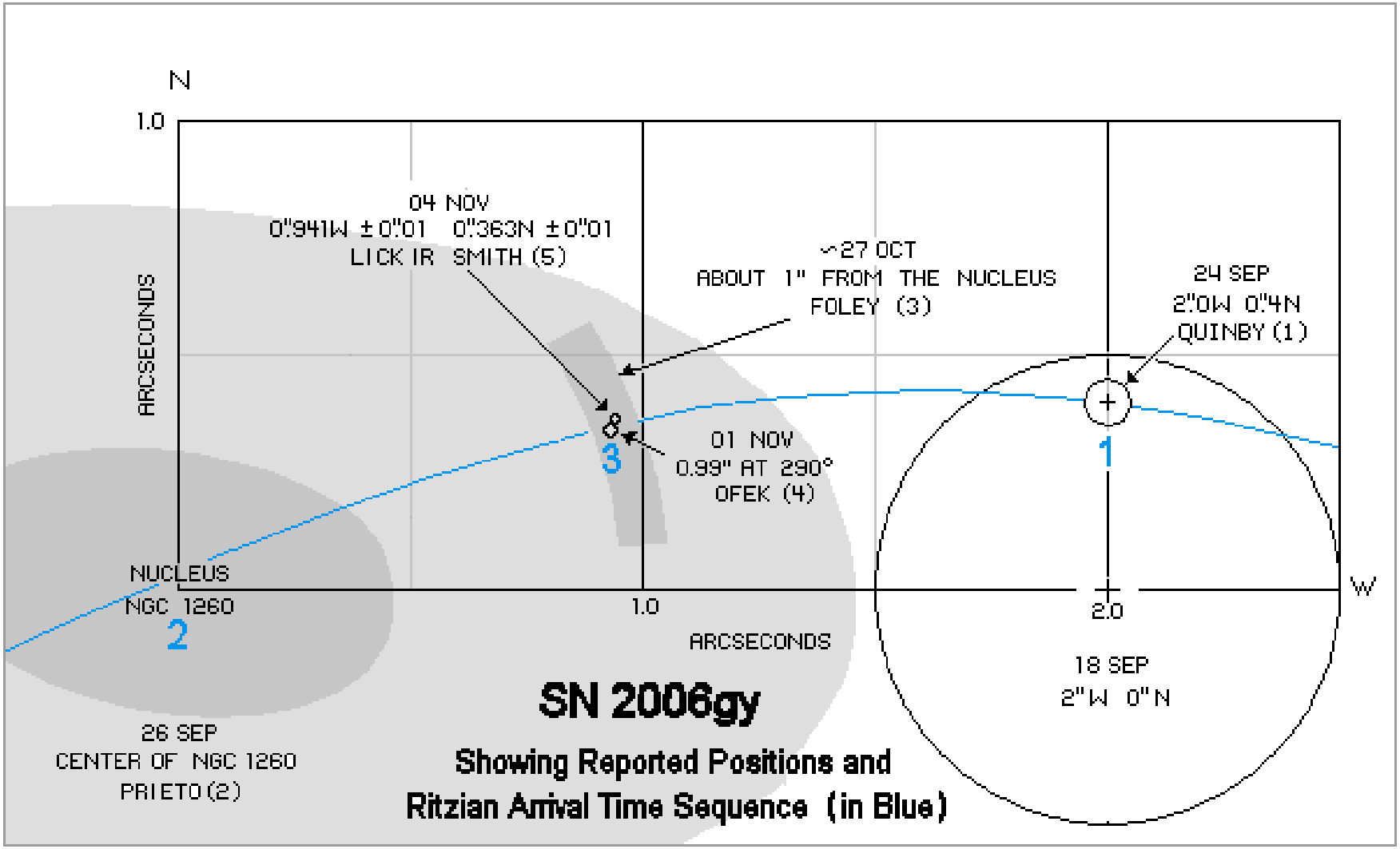
Super Nova 2006gy



NGC 1260


N
1".0
NGC 1260
1.0"
Image © 2007 DSS Consortium
©2007 Google
Pointer Dec 41°24'18.00" RA 3h17m27.18s Streaming 100%

Position History of SN 2006gy



- One arc second of angular displacement, over a period of one month, at a distance of 238 million light years corresponds to a linear speed of:
-
- **18,000 times the speed of light**
- **Houston, We've got a problem!**

If the reported celestial coordinates for SN 2006gy are correct, then it's "progenitor" must actually be a very local (dim) star, that passed close to another local (also dim) star. This encounter resulted in Ritzian relativity light variations, and the "association" with NGC 1260 is only apparent.

In this case the star was close enough to earth for us to see it at different locations along it's path.

The following animation shows how this may have occurred.

Caution!

Apparent time reversals
will be in action.

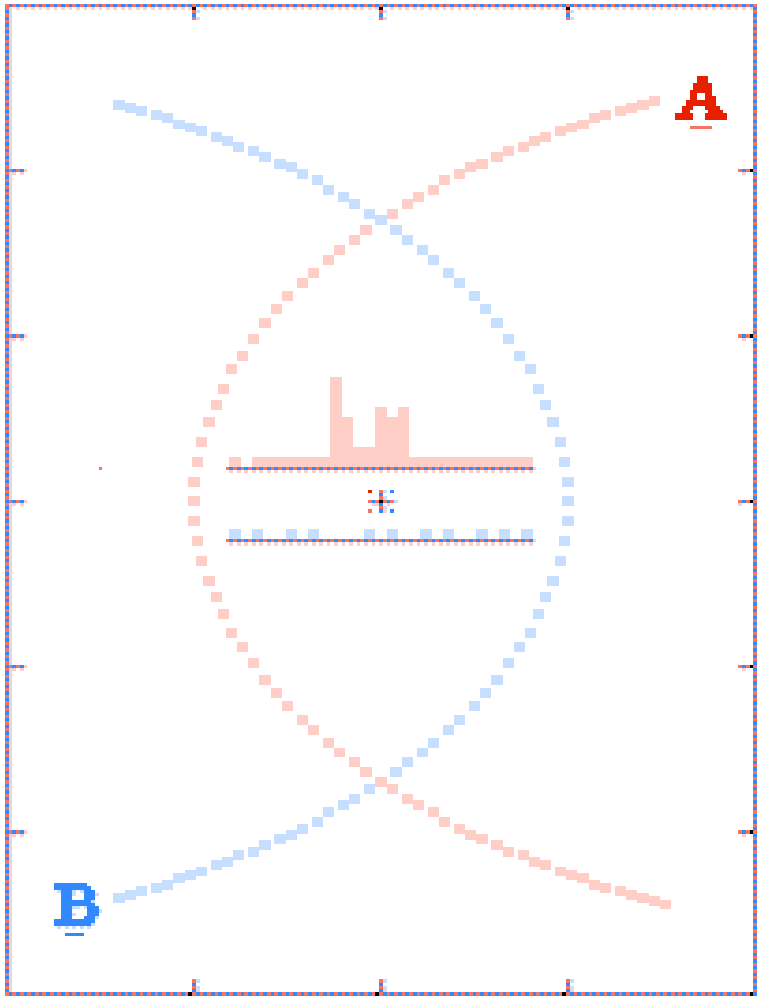
Binary encounter showing time reversal

This is the first frame of a gif animation. To see the action, please see:

http://www.shadetreephysics.com/NPA-Fritzius.ppt

or

http://www.shadetreephysics.com/sn2006gy.htm



It gets Stranger!

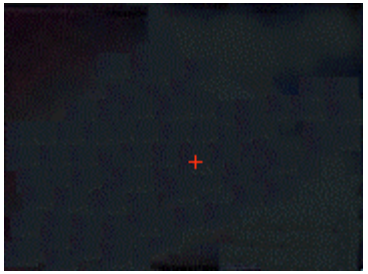
The next animation embeds the Chandra X-ray and Lick IR images of SN 2006gy into some manually prepared theoretical frames to show how the time reversal may have appeared.

Check speaker's eyes for odd motions.

Hypothetical time reversal sequence images

(These were incorporated in a gif animation.)

0



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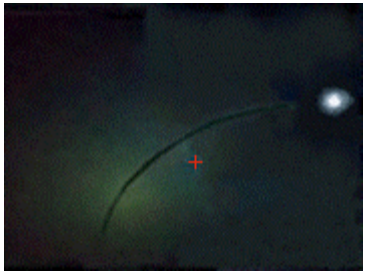

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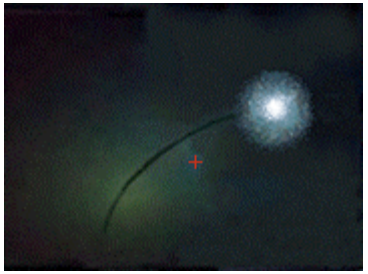

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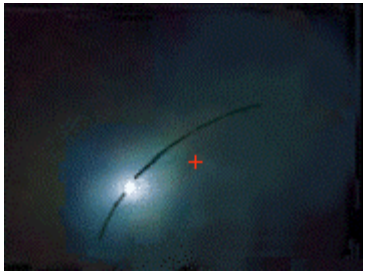

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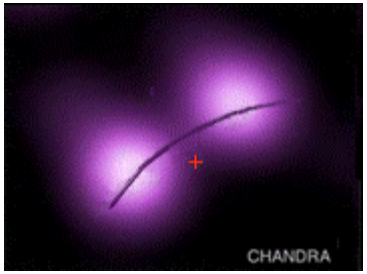
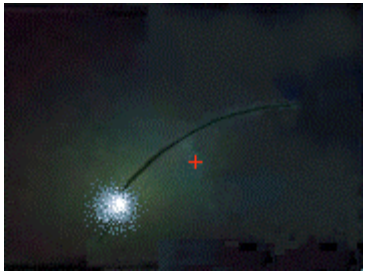


Chandra X-ray

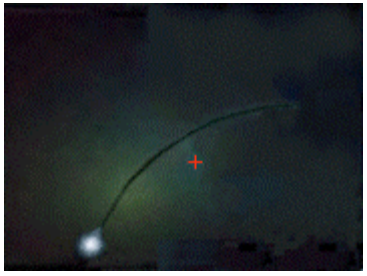
5

Lick IR

6

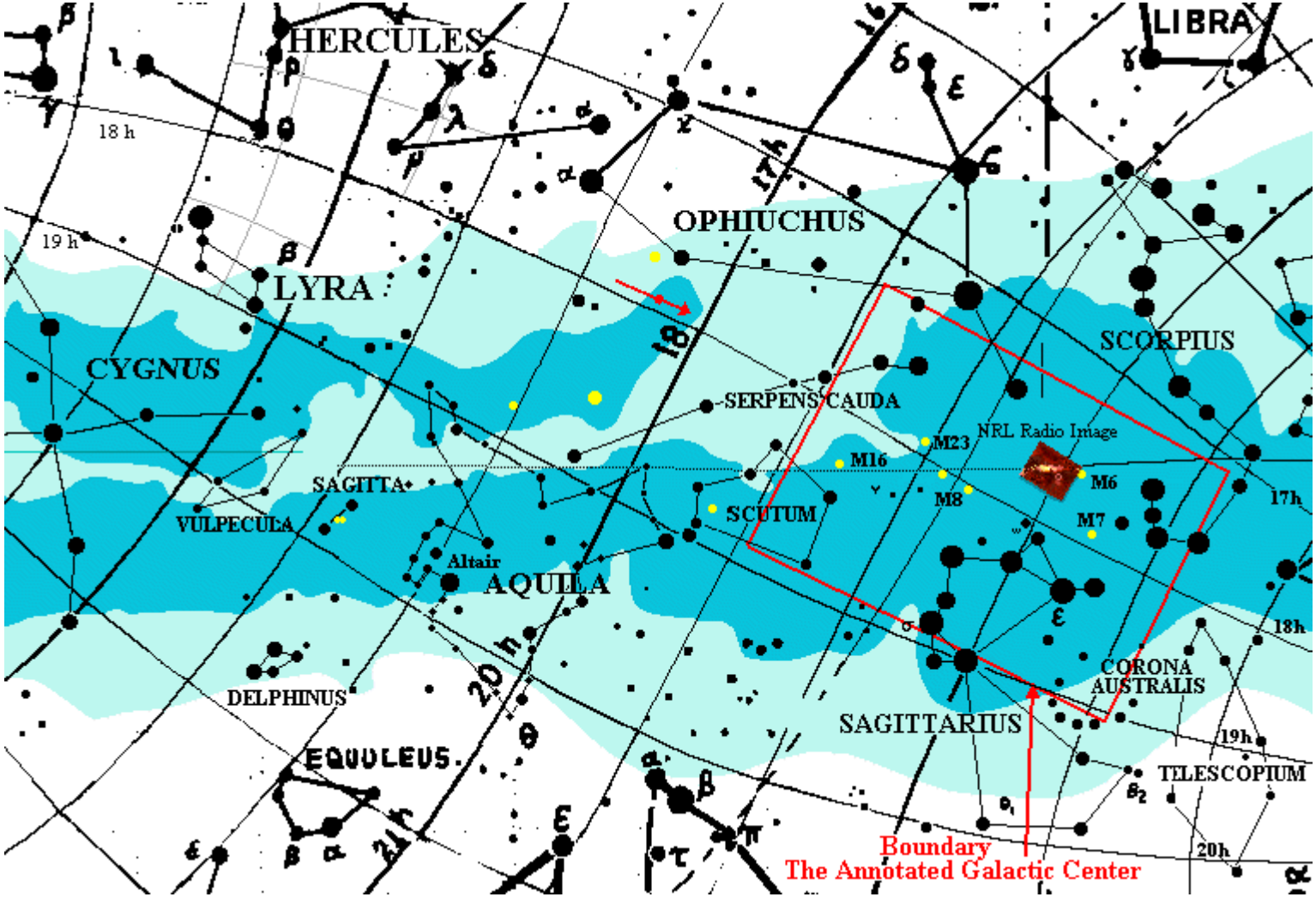


7



Barnard's Star

- Very low mass red dwarf
- Distance from sun = 5.98 light years
- Apparent magnitude = 9.57
  (1/27th the brightness of the dimmest visible stars)
- Proper motion = 0.86 arcsec/month
- It "flashed" in 1998 – Cause unknown
- Some think it has one or two planets


HERCULES
LIBRA
18 h
19 h
OPHIUCHUS
LYRA
CYGNUS
SCORPIUS
SERPENS CAUDA
NRL Radio Image
M23
M16
M6
M8
M7
SAGITTA
SCUTUM
VULPECULA
Altair
AQUILA
17h
18h
19h
20h
CORONA AUSTRALIS
DELPHINUS
SAGITTARIUS
EQUULEUS
TELESCOPIUM
Boundary
The Annotated Galactic Center

SN 2006gy Astrometry References

CBET = The Central Bureau for Electronic Telegrams
(Central Bureau for Astronomical Telegrams)

- (1) Quinby, R. 24 Sep 2006, CBET 644, 1
- (2) Prieto, J.L. et al., 26 Sep 2006, CBET 648, 1
- (3) Foley, R.J. et al., Apx 27 Oct 2006, CBET 695, 1
- (4) Ofek, E.O., et al., *The Astrophysical Journal*, 659: L13-L16, April 10, 2007.
- (5) Smith, N., et al., arXiv:astro-ph/061267v3 22 May 2007

Other Links

- Translation of Sekerin's paper
- http://www.shadetreephysics.com/sekerin.htm

- Followup work by author:
- http://www.shadetreephysics.com/binaries.htm