

# ***Study of quiescent and late-postoutburst stages of novae***

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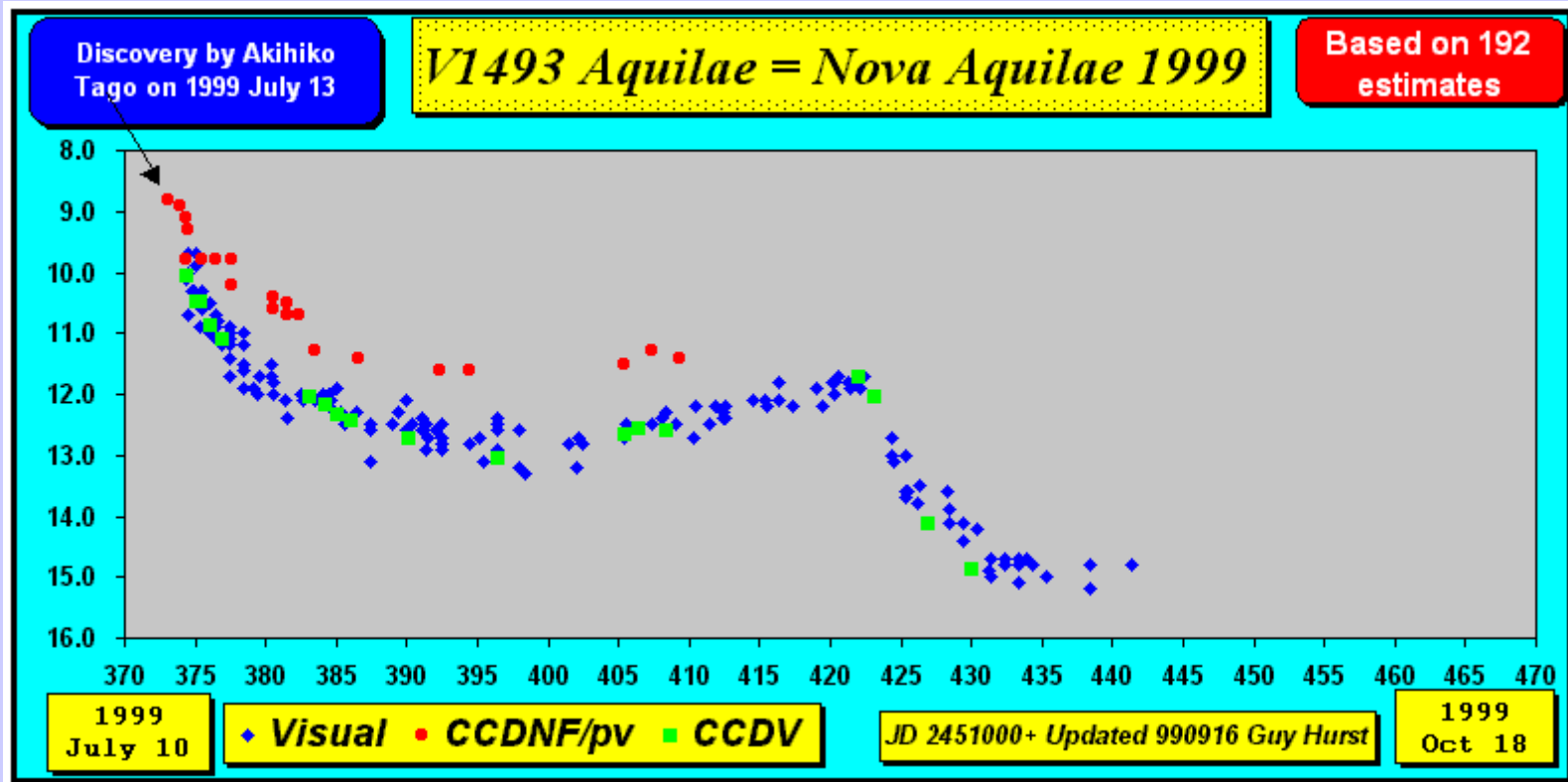
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# ***Novae***

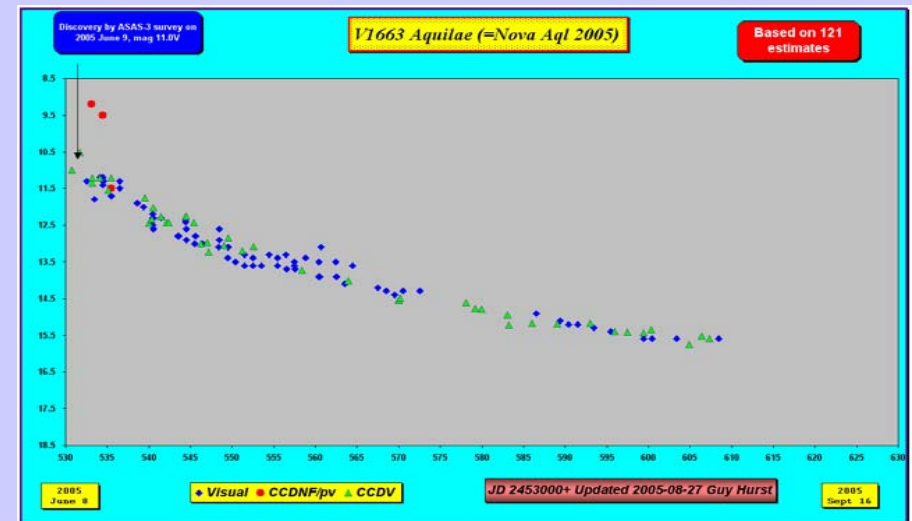
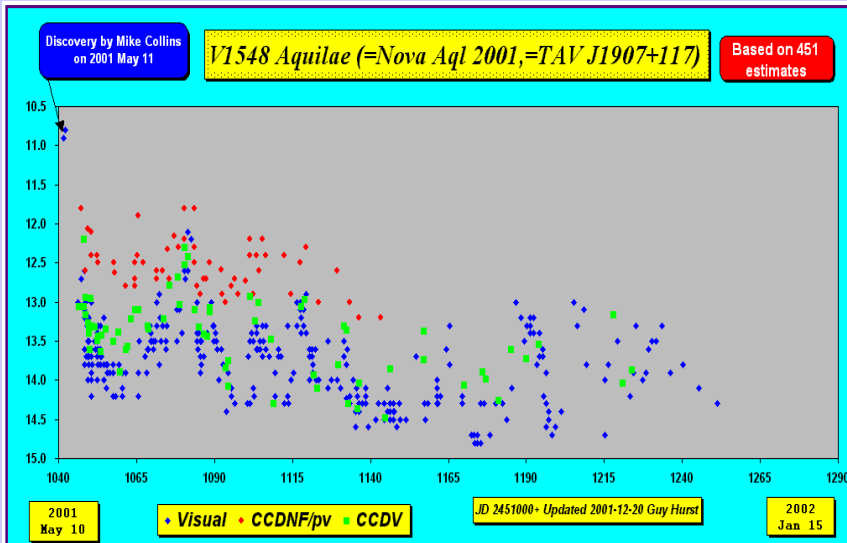
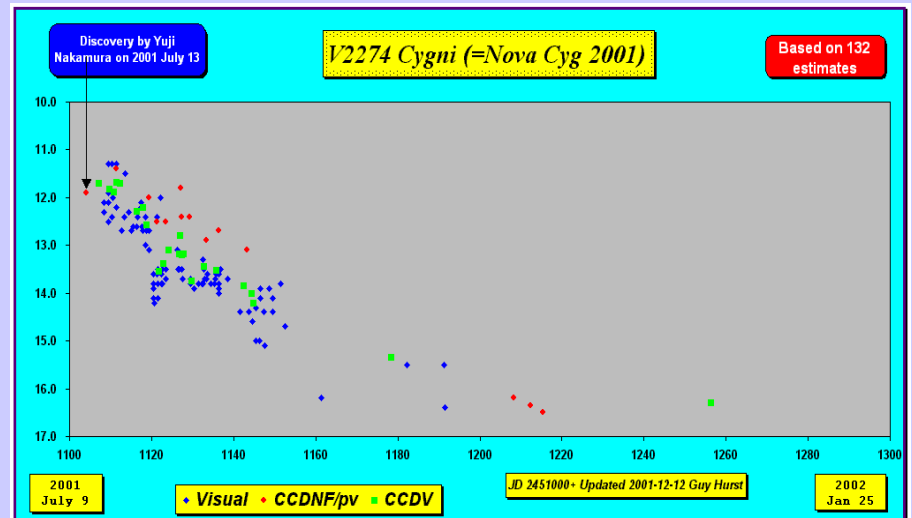
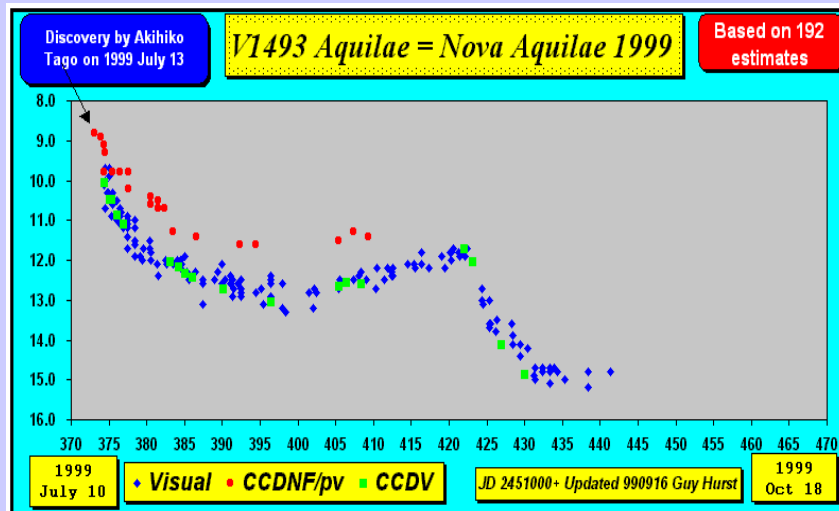
- WD + MS close binary systems ( $P_{\text{orb}} \sim \text{hrs}$ )
- Cataclysmic variables at kpc distances.
- Eruption :Thermonuclear runaway of degenerate matter on the surface of the WD.  $10^{-5}M_{\odot}$  ejected @  $\sim 1000 \text{ km/s}$ .
- Steady nuclear burning on the WD surface.
- Ejecta pass through several phases : neutral  $\rightarrow$  nebular  $\rightarrow$  coronal.

# Light curve of a nova



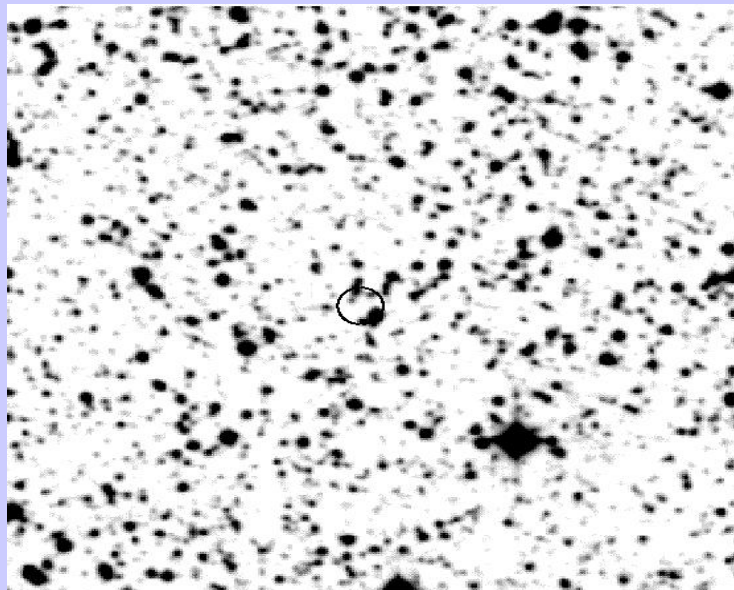
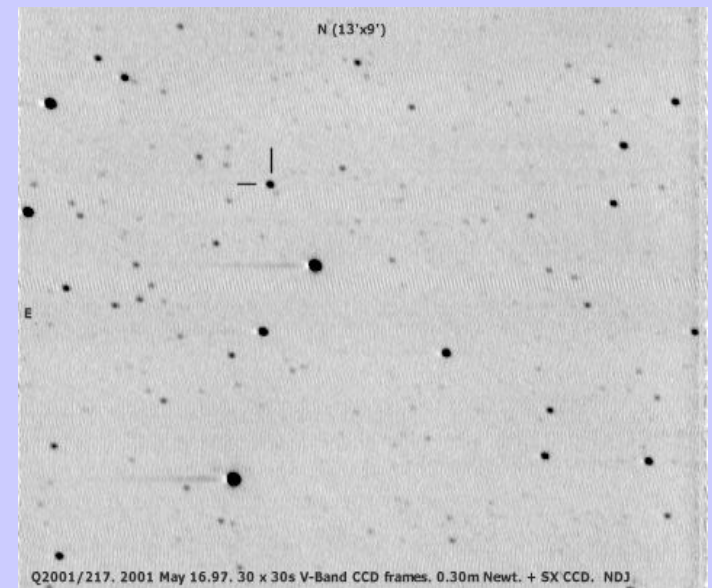
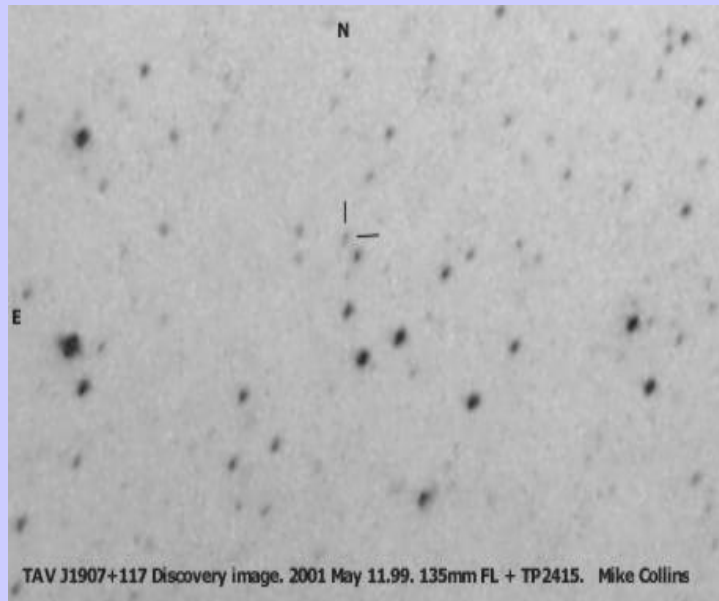
t<sub>3</sub> timescale : few days (v.fast & fast), month (slow),  
several months (v.slow).  
Spectrum changes on a similar timescale.

# Light curves of some novae



Every nova is different ! -- light curve & spectral evolution.

# *Nova V1548 Aquilae 2001*

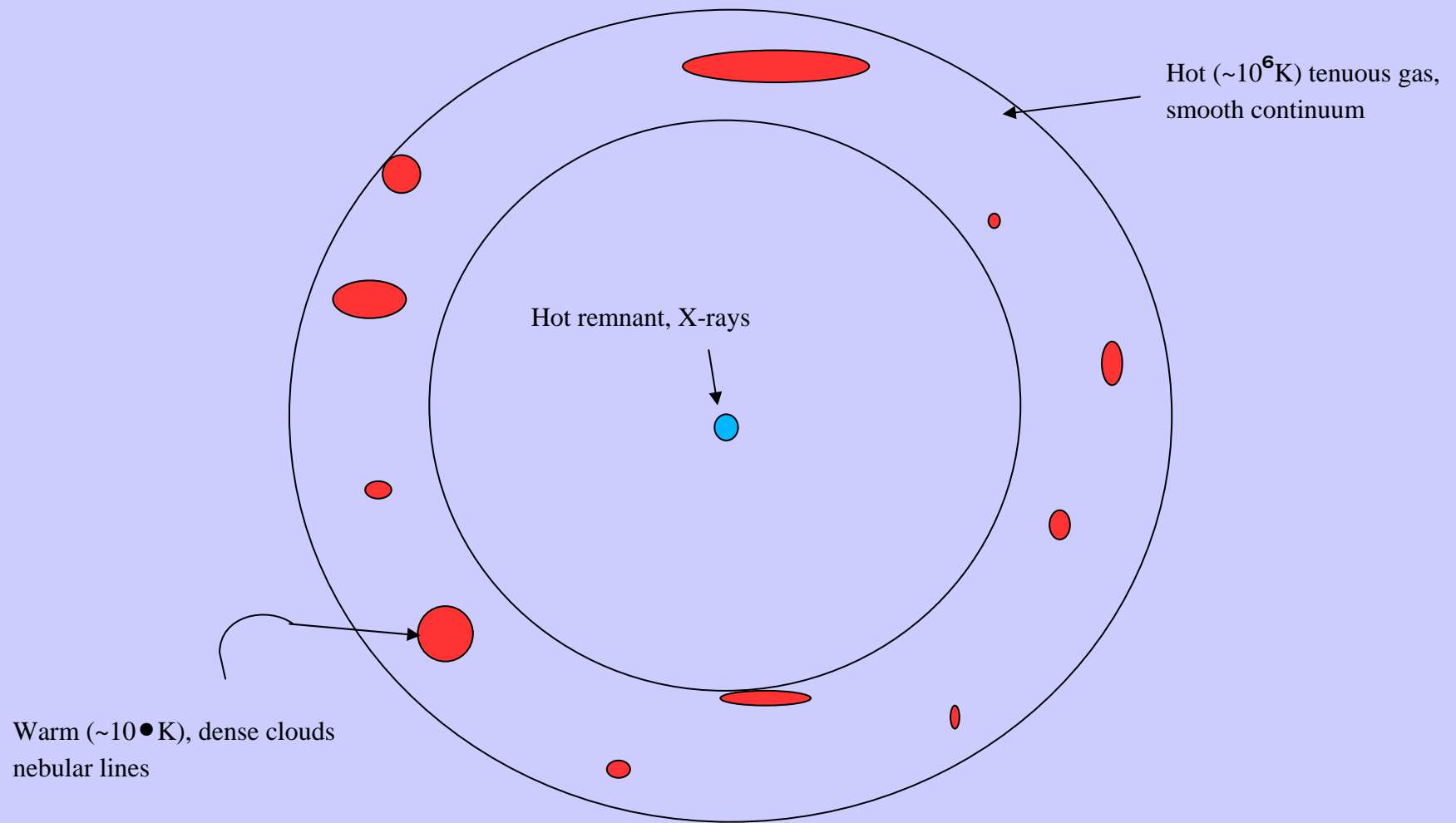


Discovery image

Confirmation

POSS- II image

# *Composite model of a nova shell*



# *Late stages and quiescence*

- The very late stages of a nova outburst are not well-studied. How long does quiescent burning last?  
? Coronal phase □ duration of quiescent burning.
- Identification of the quiescent nova is often not unambiguous.
- Recover quiescent novae by *UBVRI* imaging. Even non-detections are important □ Precursor, outburst mag
- Photometric variations □ nature of the accretion disc, orbital period.

# *Late stages and quiescence*

- Spectra □ mass accretion, nature of accretion disc, nature of components & their interaction.
- No spectra at outburst □ use quiescence spectra for confirmation as a nova.
- Shell ? 1" radius in 5 yrs □ expansion velocity, distance, structure.
- TNR triggers & RN behaviour in the inter-outburst period.
- Implications for theoretical models of nova outburst, hibernation scenario, inter-class relationship among CVs, population studies, etc.



# *Requirements of the project*

## Constraints

- ☐ Faint quiescence
- ☐ Poor S/N
- ☐ Close companions
- ☐ Confirmation

## Needs

- ☐ Dark sky
- ☐ Long integrations
- ☐ Good seeing
- ☐ Pointing & tracking
- ☐ Telescope time

# *HCT observations -- non-detections*

- Scuti 1981
- Aql 1985
- V1548 Aql 2001
- V1493 Aql 1999#1
- V2274 Cyg 2001#1
- V381 Lac

# *HCT observations – probably seen*

- V465 Cyg 1948
- Cep 1983
- Per 1853.

Are they the true counterparts ? Follow-up and monitor.

# *HCT observations – clearly seen*

- U Sco
- V2487 Oph 1998
- V838 Her 1991
- V1378 Aql 1984
- IV Cep 1971
- V705 Cas 1993
- V723 Cas 1995

Why are they still bright ?