



News on the Optical and Radio Variability of MWC349

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&

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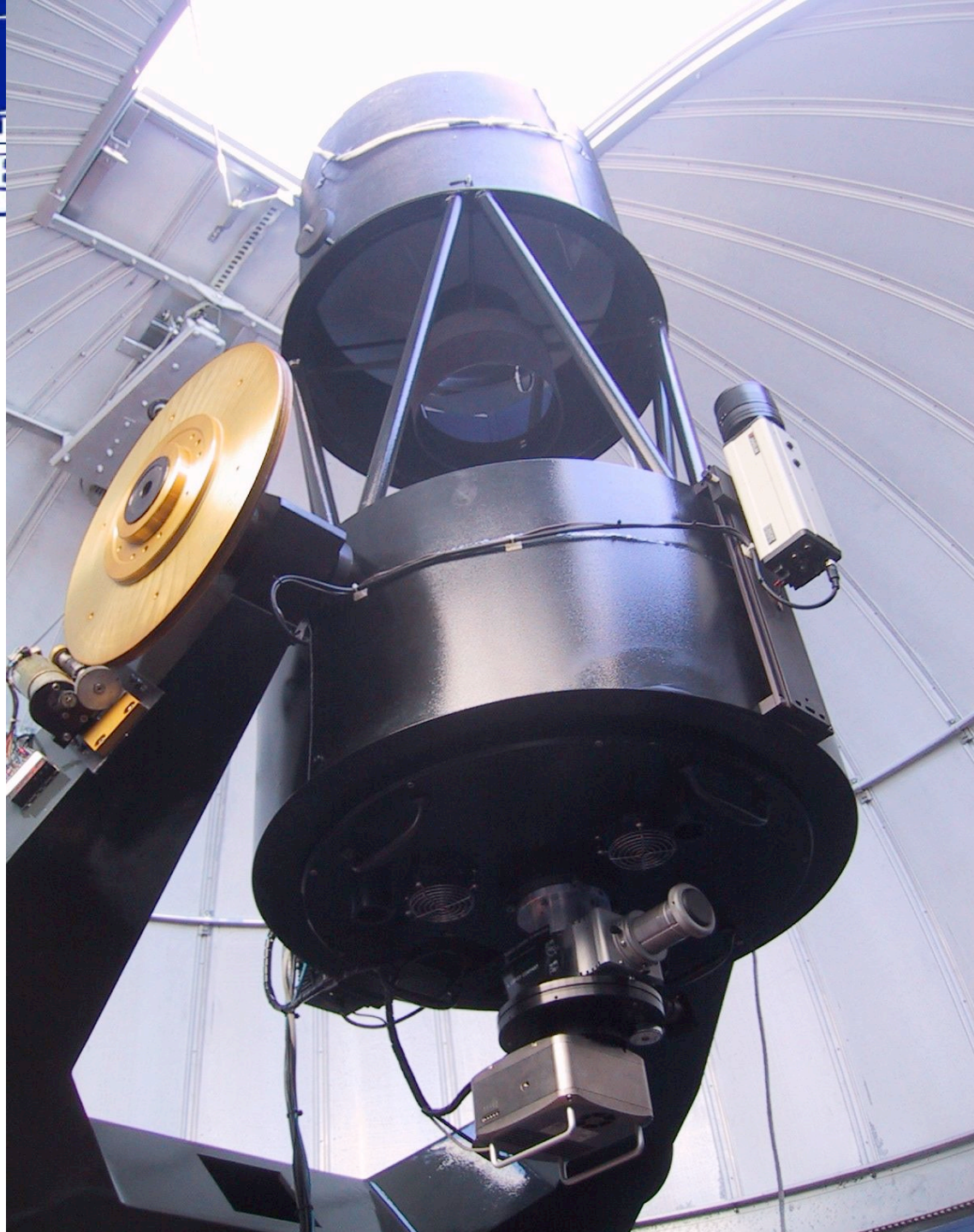
Abstract:

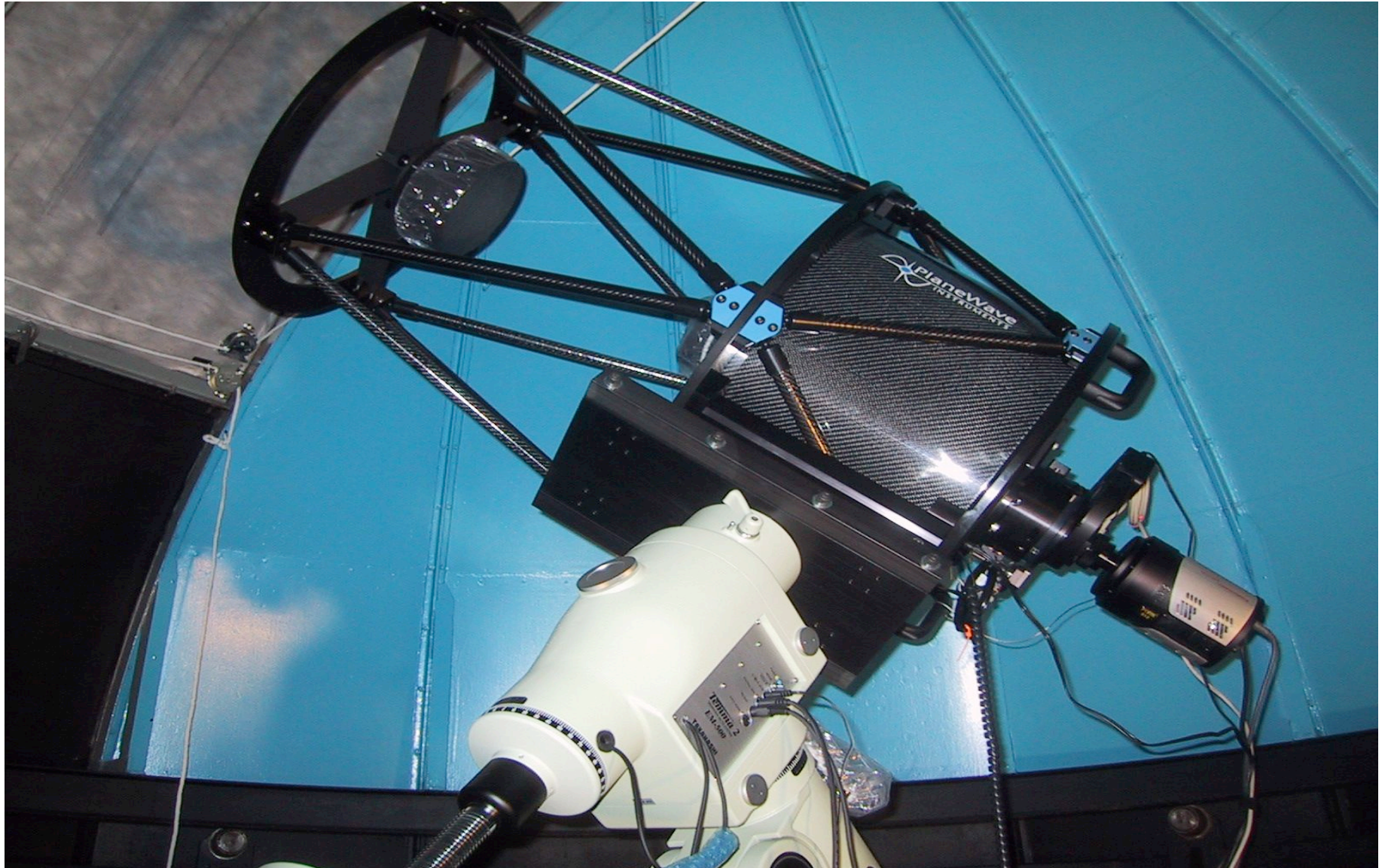
The results of the long-term (11 years) monitoring of MWC349 at optical and radio wavelengths, as well as a recent (summer 2008) experiment of simultaneous optical and radio observations to detect short-term variability, will be summarized. In particular, we will compare the results obtained with the 24-inch CCD telescope of the MMO with those submitted to the AAVSO database by various observers. The revealed amplitudes of MWC349 variations are small – a few tenths of a magnitude for a long-term variations (years) and, typically, less than one tenth for the short-term variations (months to days). This requires a relatively high accuracy photometry, not always achieved in amateur observations. The data obtained so far can be summarized as follows: (1) No obvious periodicity; (2) The amplitude of variations monotonically decreases with the decreasing time scale and towards longer wavelengths; (3) There is correlation of optical (R) and radio (hydrogen recombination line maser) radiation on both a long and short time scales, but the amplitude of the radio variations is greater. Possible interpretation of these results will be discussed. **This project was supported by the NSF/REU grant AST-0354056 and the Nantucket Maria Mitchell Association.**

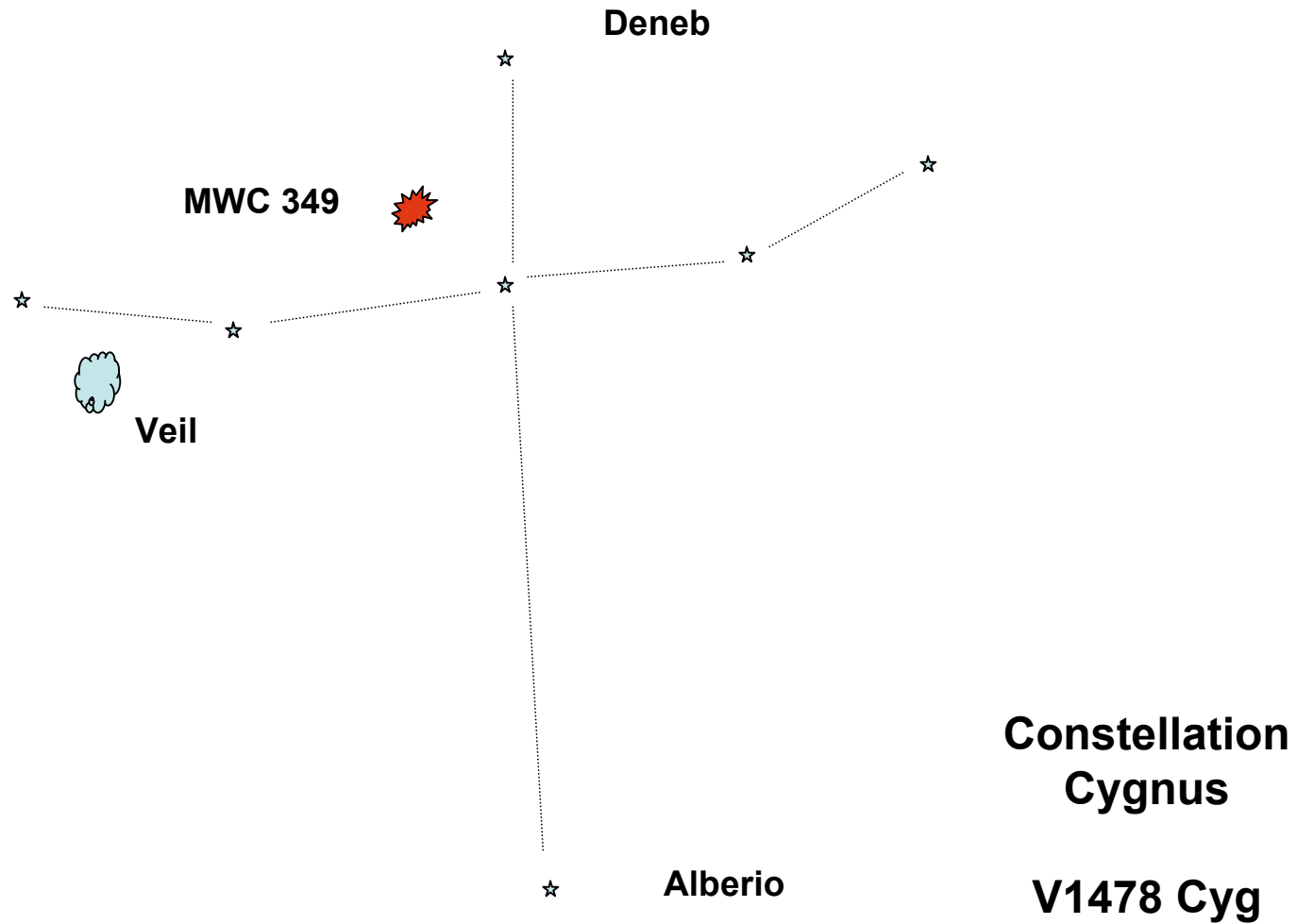


Maria Mitchell Association/Observatory

- **MMA—10 Buildings, 24 Summer Interns, Astronomy, Natural Science, Education, Marine Science, Library, Curation**
- **MMO—Astronomy Department**
 - **Director Dr. Vladimir Strel'nitski**
 - **Telescope Engineer and Astronomer Gary Walker**
 - **Original Prototype of REU Program Started by Dorrit Hoffleit**
 - **6 Astronomy Majors every Summer are Taught Research**
 - **All write Posters for AAS Meeting in January**
 - **100 Applicants—Harvard, Columbia, Swathmore, BU, Berkley, Rice**
 - **Projects cover Radio, Optical Observational, and Theoretical**
 - **Prest Grant and Vladimir's Energy have made MMO a Premier Program**

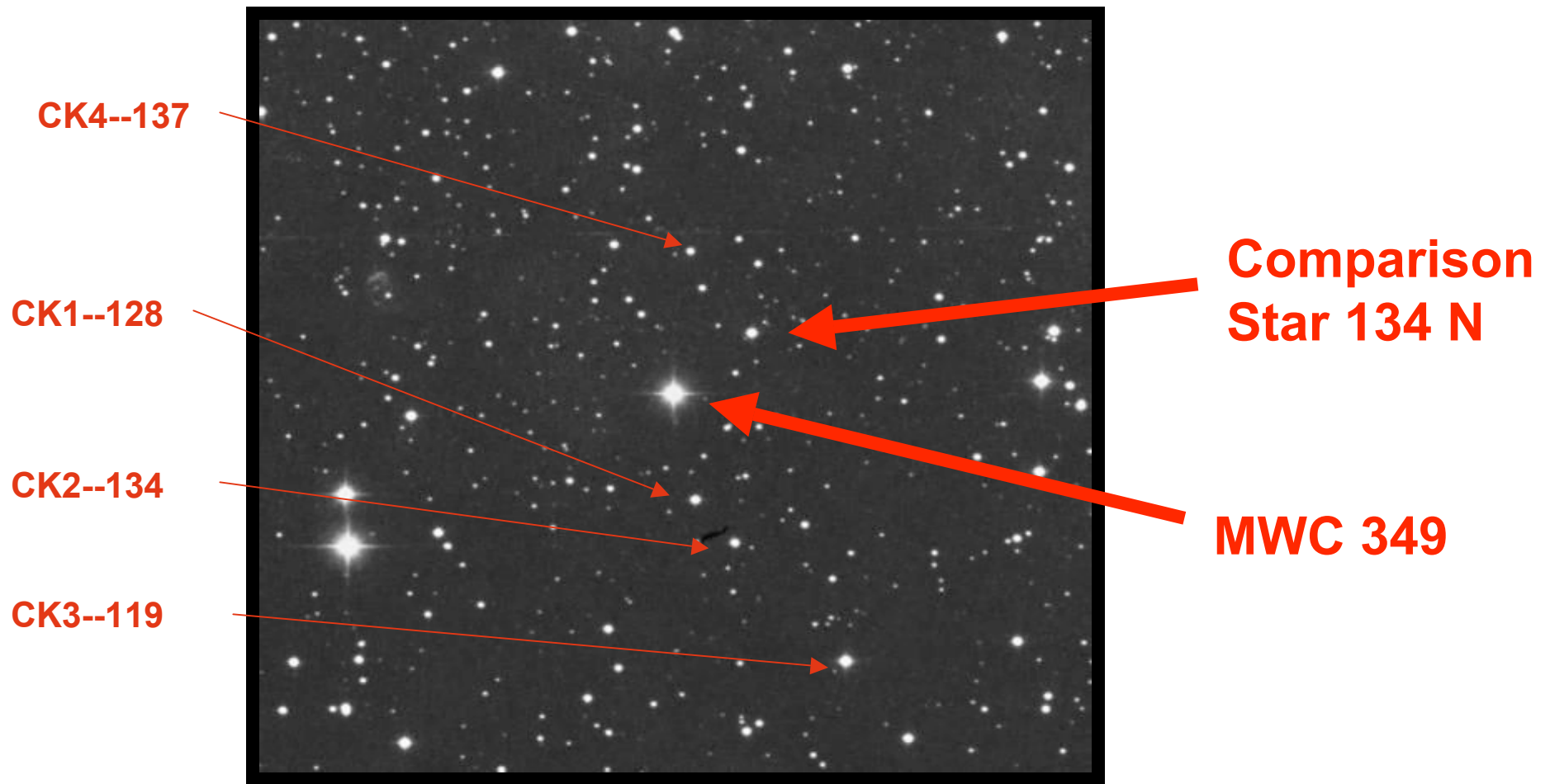








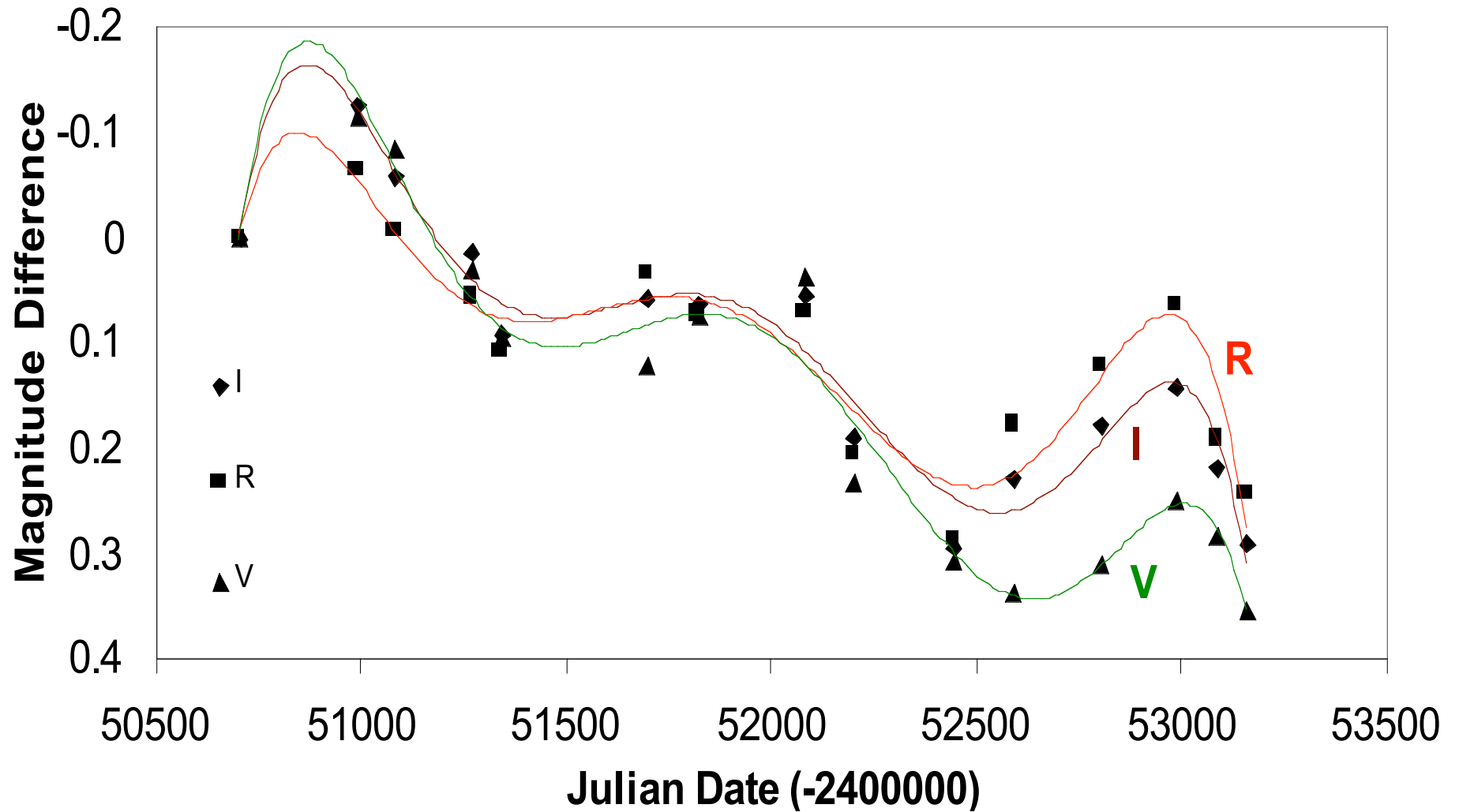
40' South of the Cyg OB2 center: MWC 349





It has been observed in...

- **Visible**
 - emission line star (MWC 349)
 - variable star (V1478 Cyg)
- **IR**
 - neutral gas/dust edge-on disk
- **Radio, mm, sub mm**
 - ionized disk and outflow; masers and lasers in hydrogen recombination lines





Plan (and Proposal) for 2007-08:

MMO plan

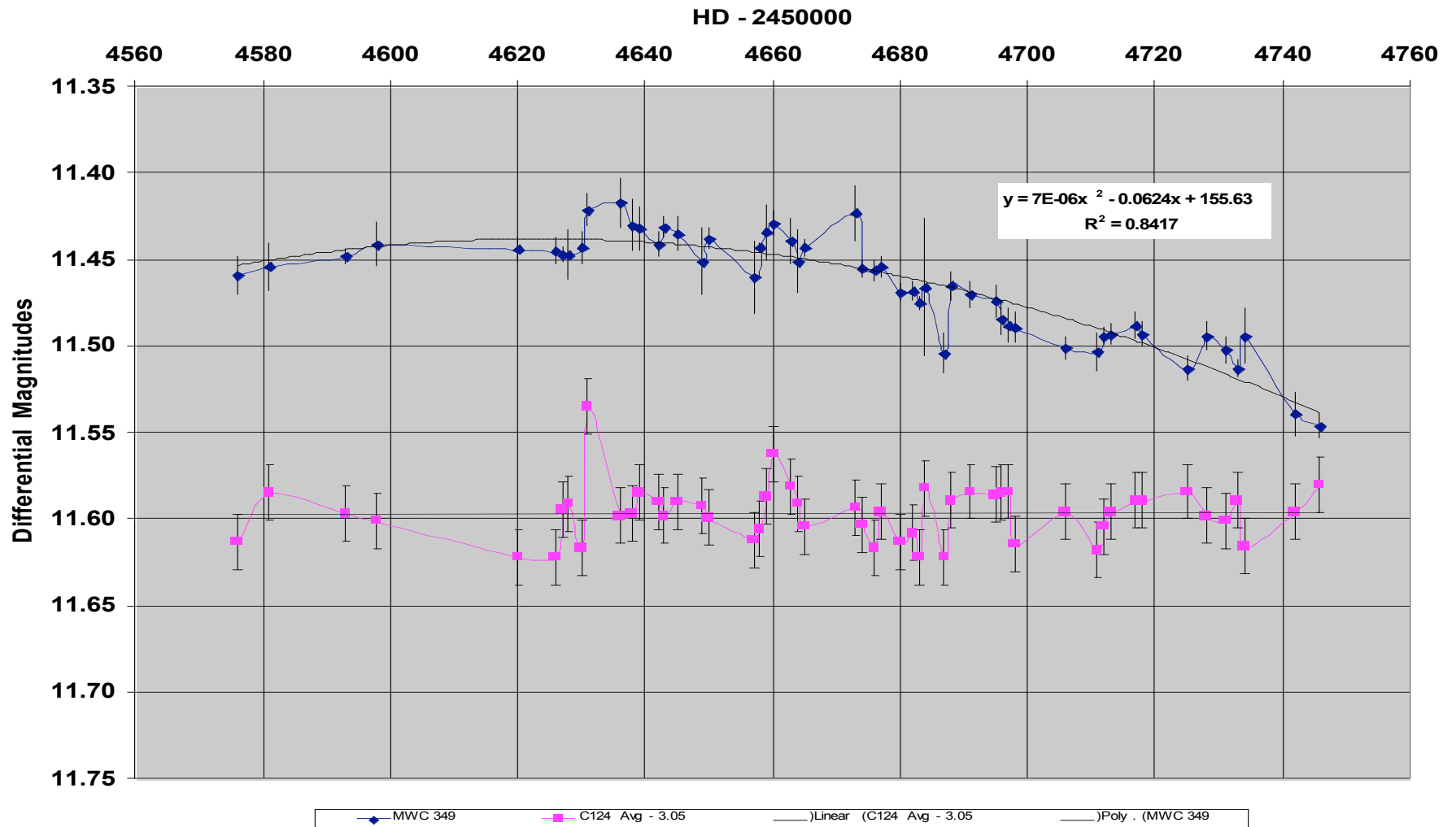
- Intensify parallel visible and radio monitoring
- Include H α and IR monitoring
- Observe lasing mid-IR rec. lines from SOFIA and possible X rays from CHANDRA

Proposal

- Personal collaboration or making MWC 349 an AAVSO “Star of the Year” for 2007-2008
- Summarize all the results at the AAVSO annual meeting in Nantucket, October 2008 (MMO’s Centennial)

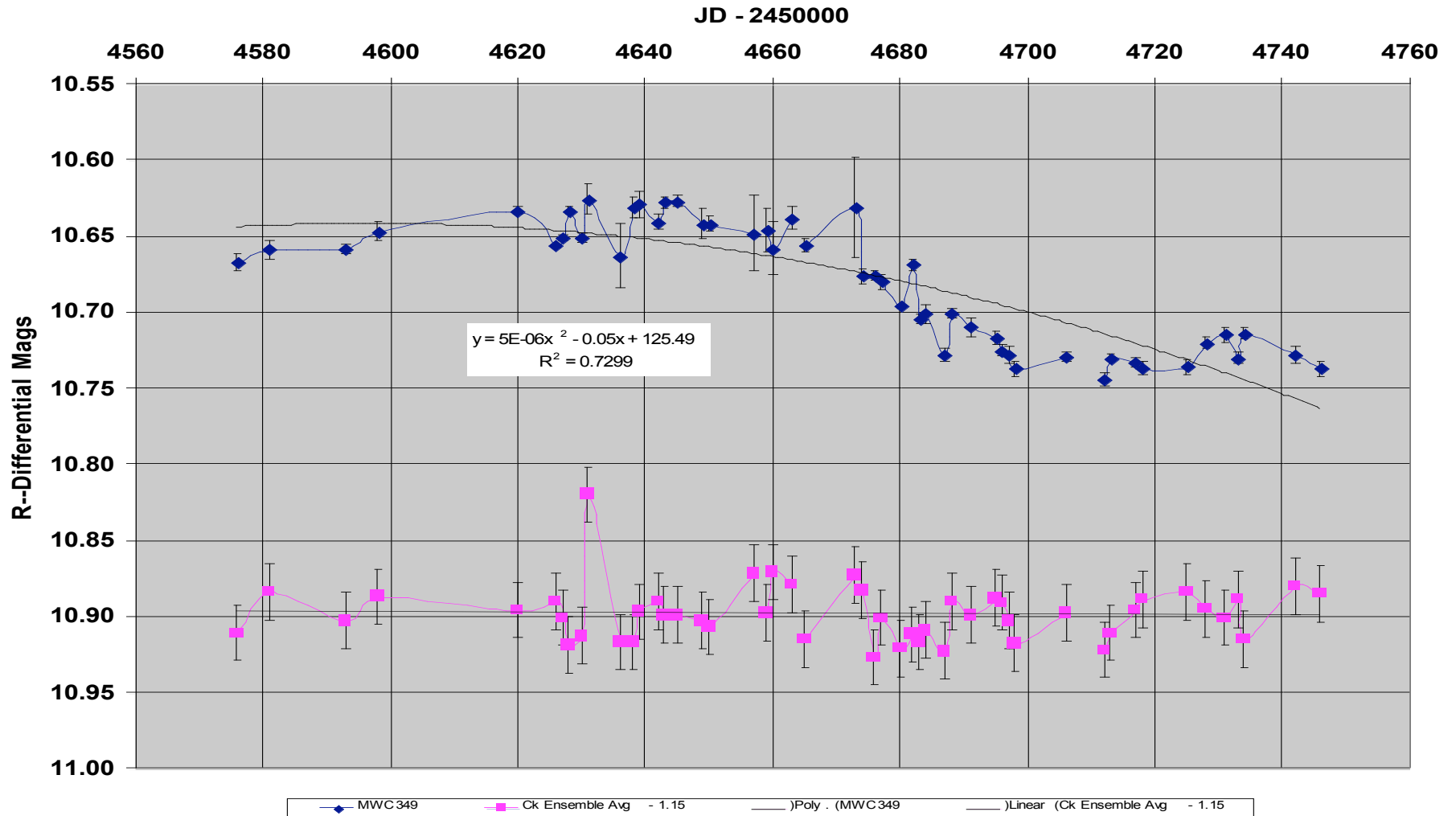


Haw--MWC349--Summer 08



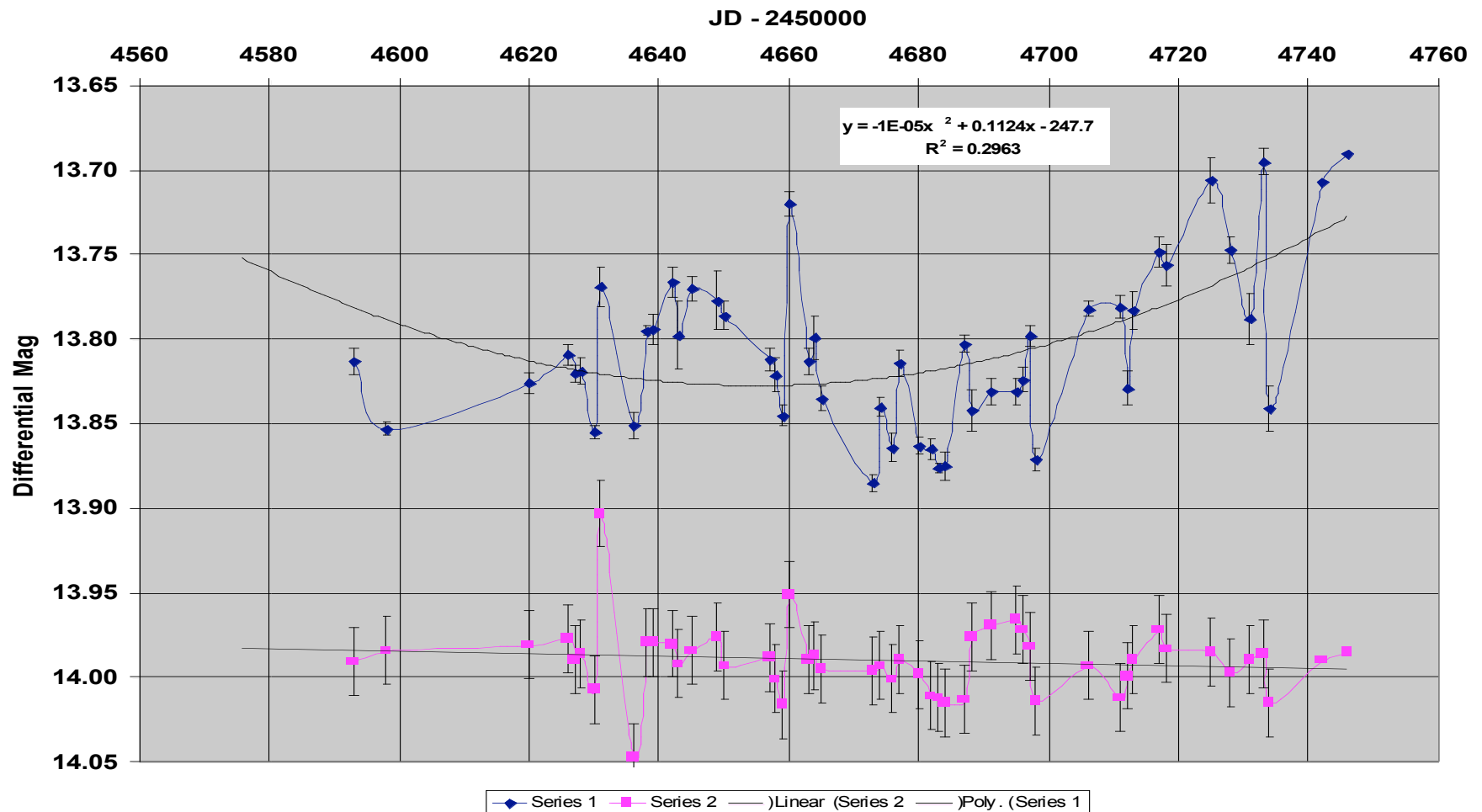


R--MWC349_Summer 08



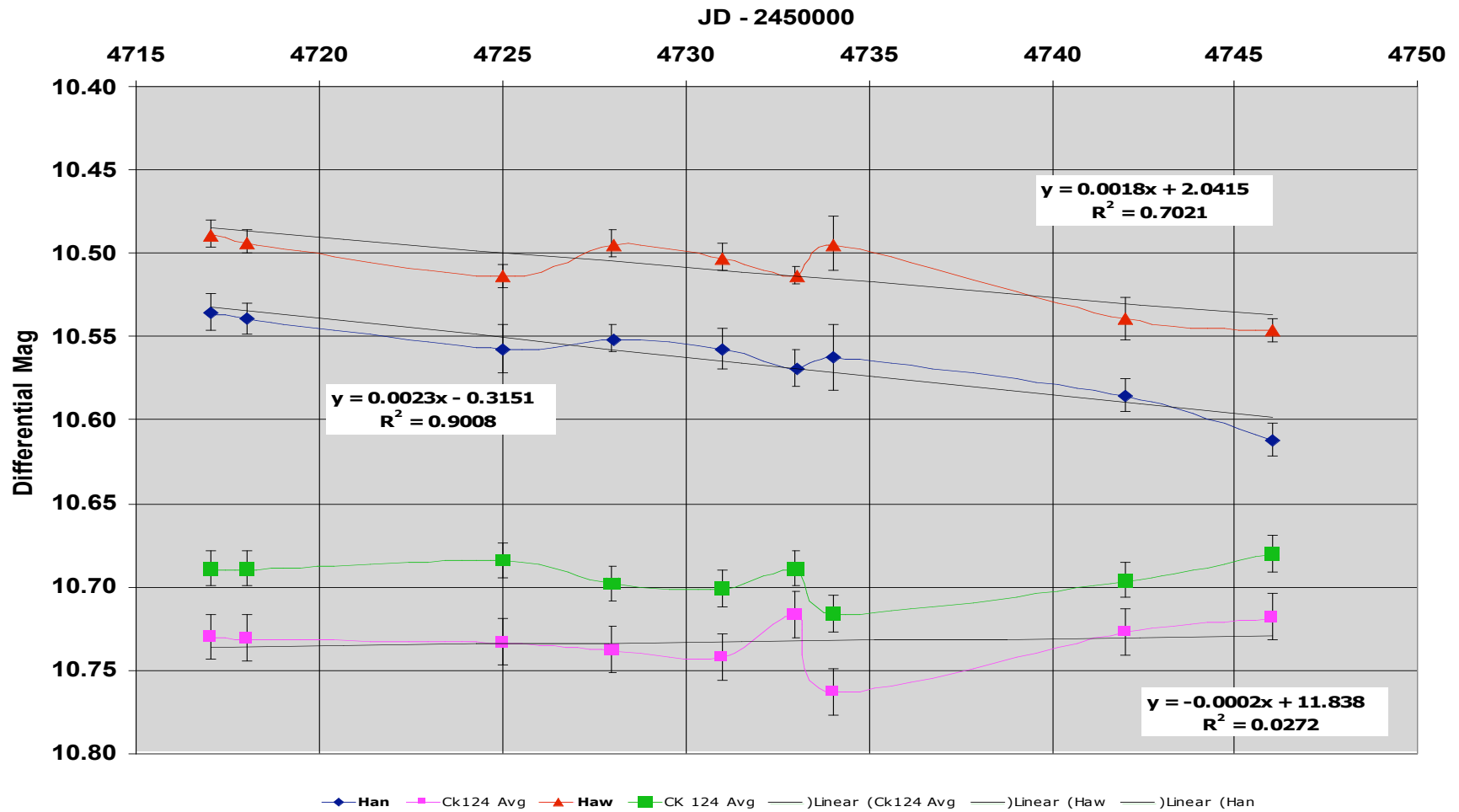


Ri--MWC349--Summer 08





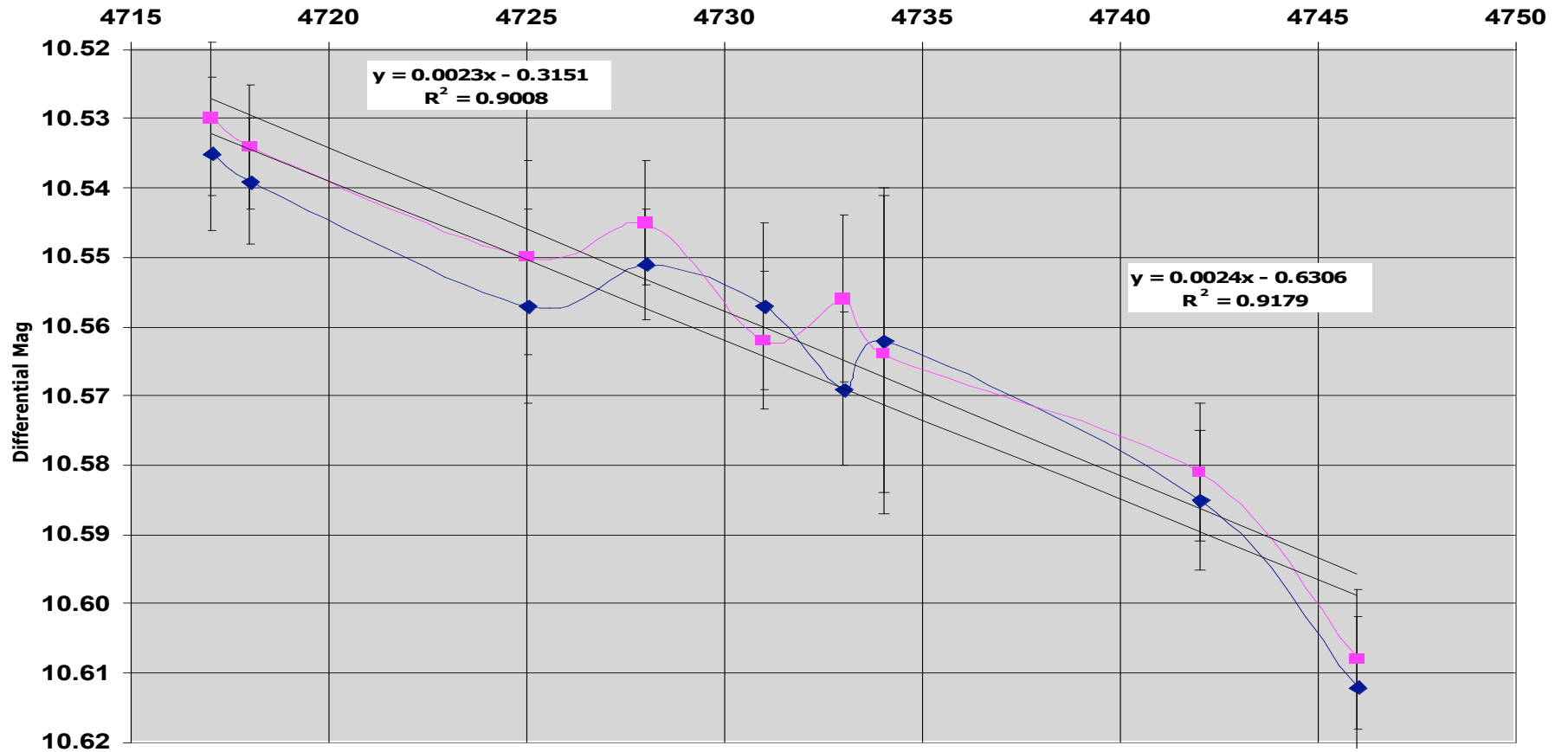
Haw and Han Comparison; MWC 349





Comparison of Flat Fielding

JD - 2450000



◆ Han Raw

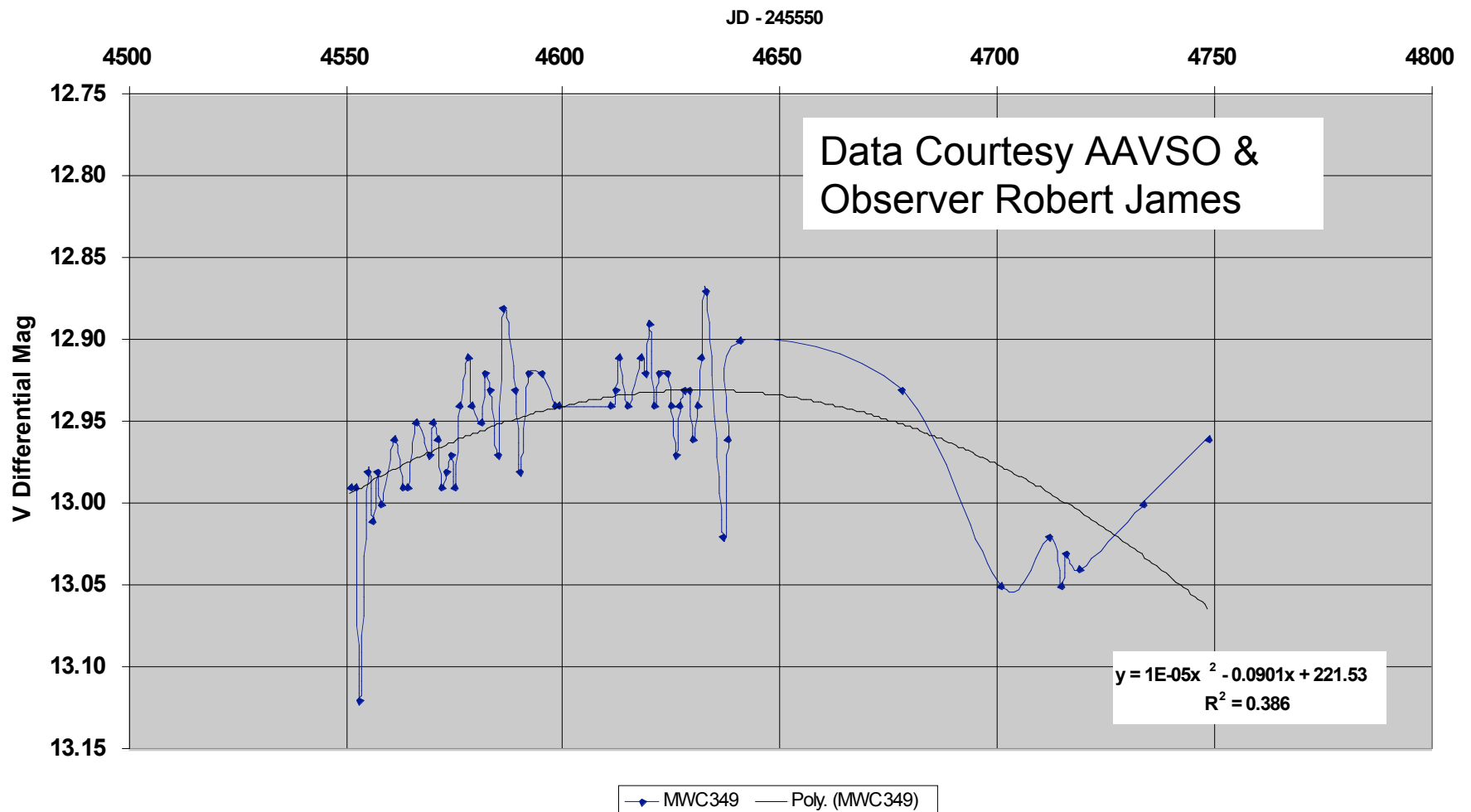
■ Han FF

—)Linear (Han FF

—)Linear (Han Raw

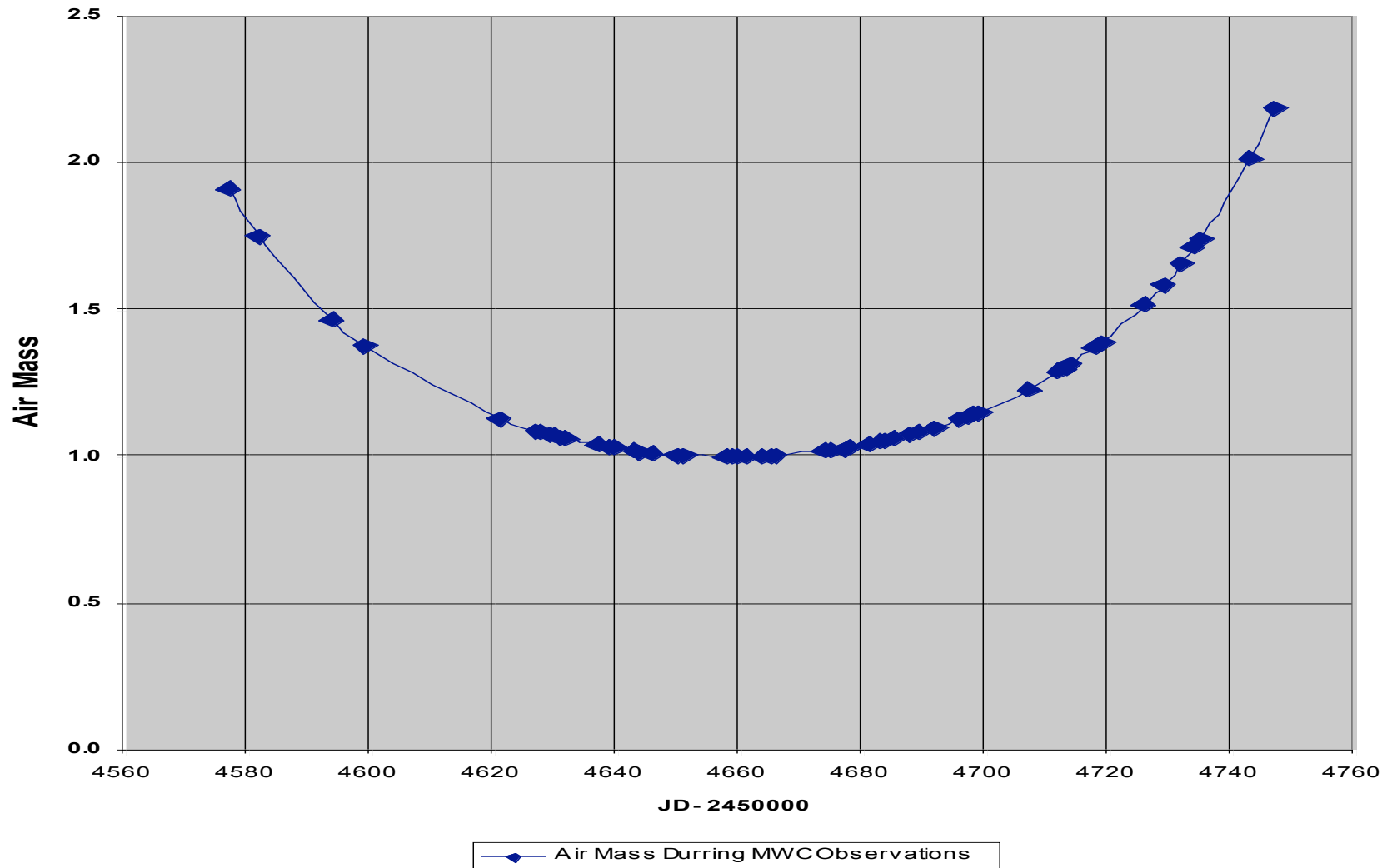


AAVSO V Data; MWC349



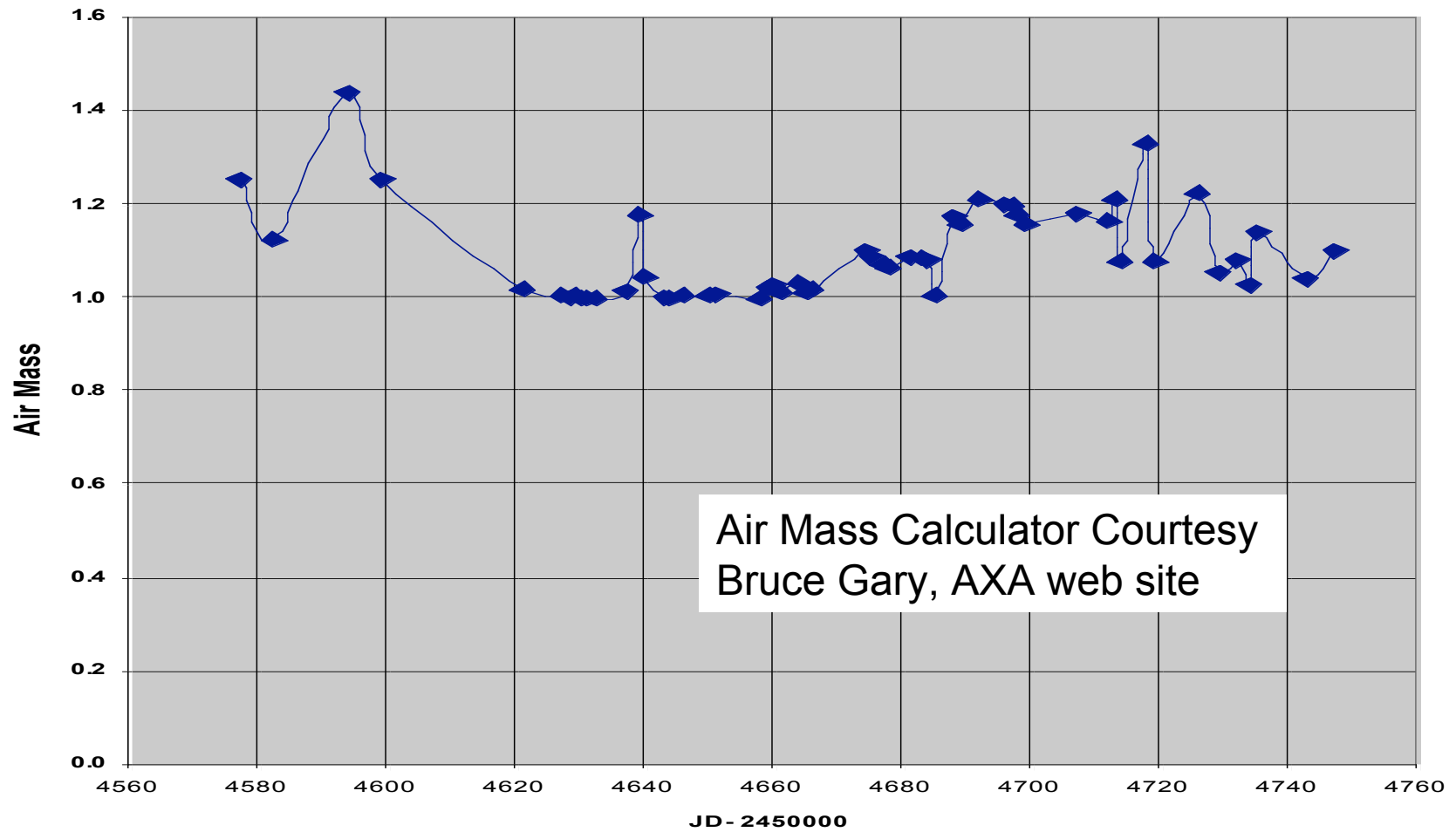


Air Mass During MWC349 Observations





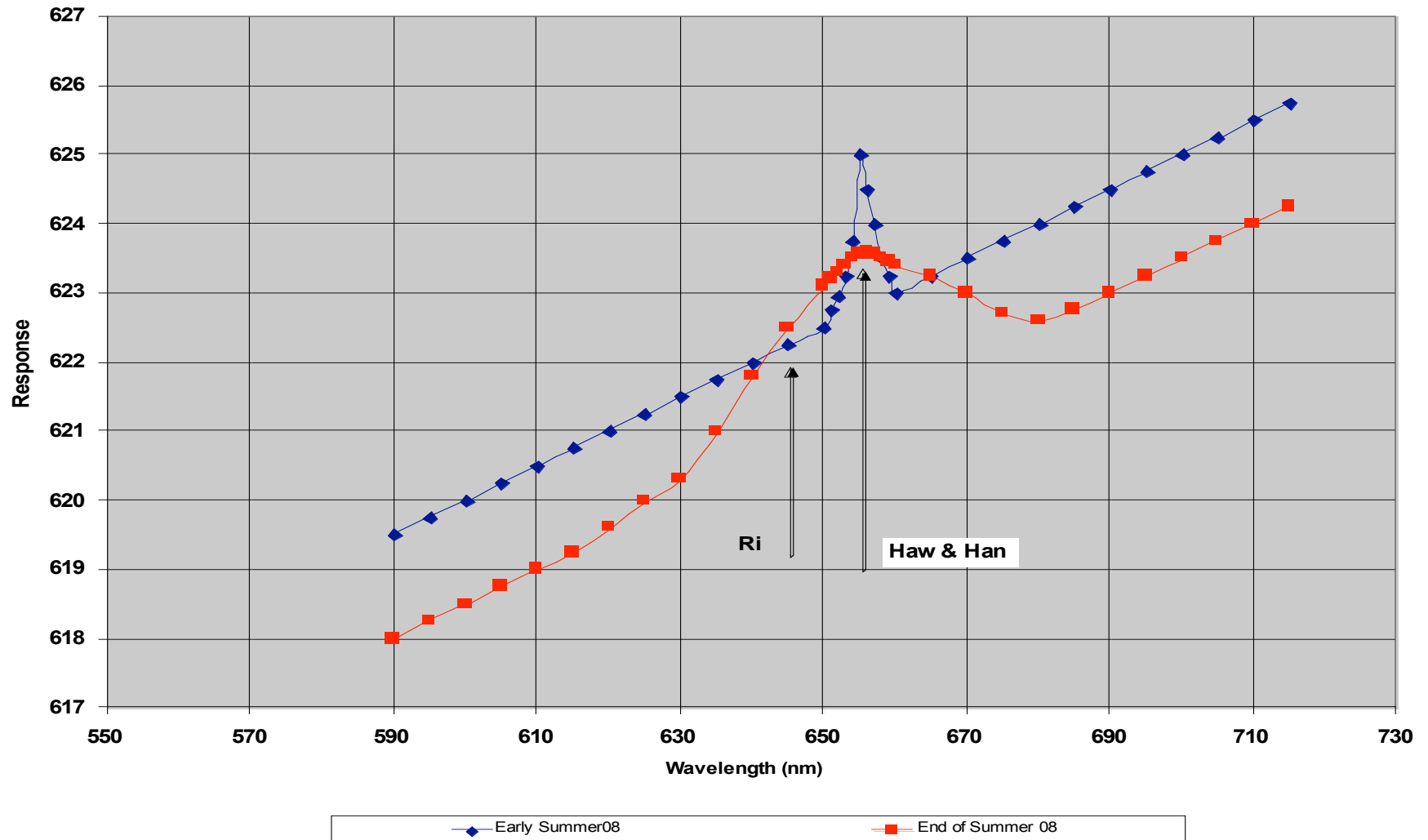
Air Mass During MWC349 Observations

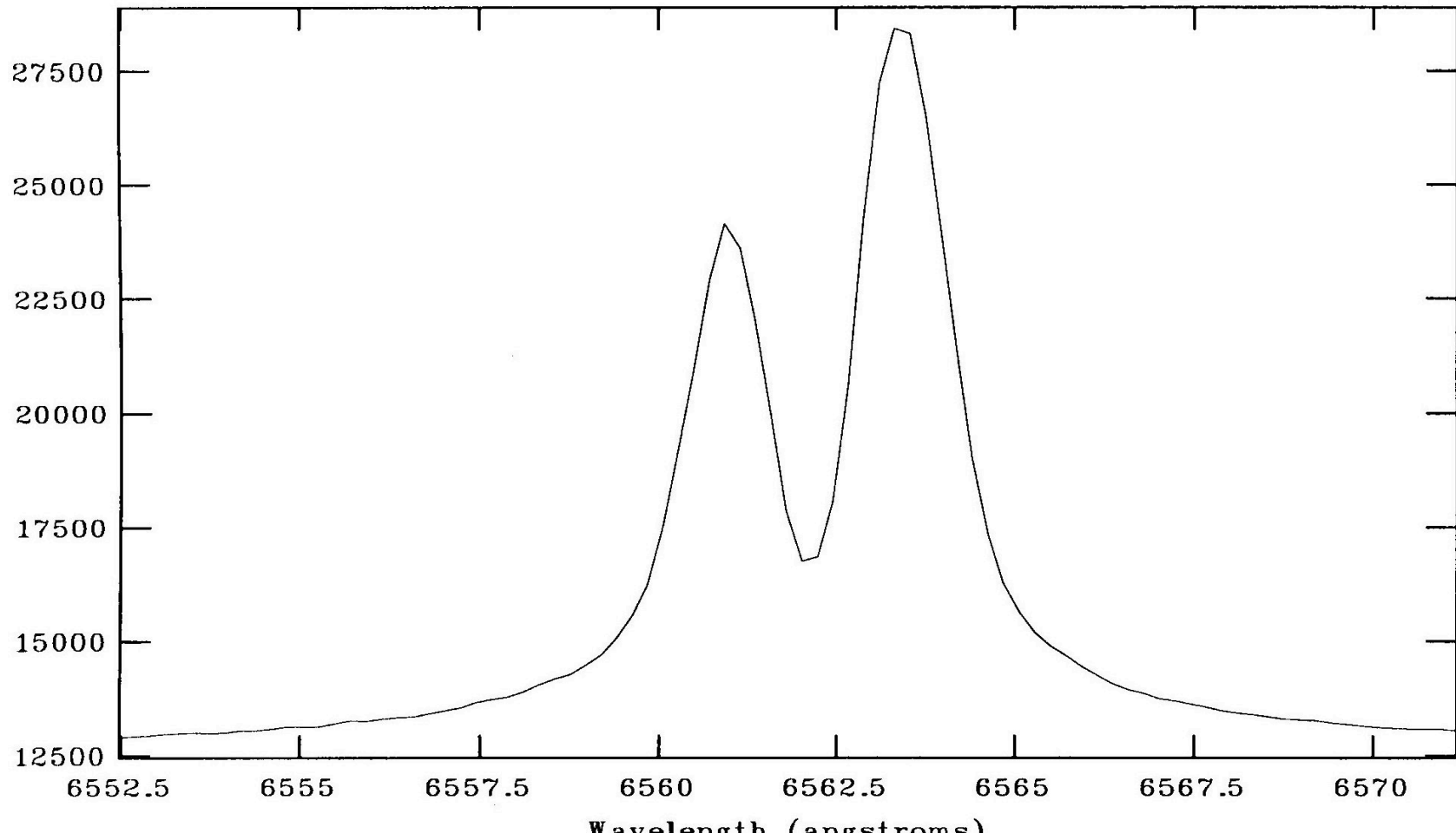


—◆— Air Mass Durring MWC Observations



Possible Spectra







Conclusions

- Work in Progress
- Need Nightly Spectra
- May monitor in Sii—(672nm)
- Try Simultaneous Radio and Optical monitoring
- Look at other objects with Ri (645nm) Band







Conclusions

- **MWC349 is a unique young object in a transitory evolutionary state (10^2 - 10^3 yrs)**
- **Masing lines are highly variable indicating fast variations of the central object or local conditions in the disk**
- **Optical continuum probes the nature of the central object and its closest environment; shows now a secular decline and possible periodicity (a binary? magnetic cycle?)**