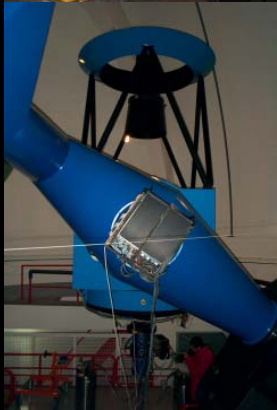


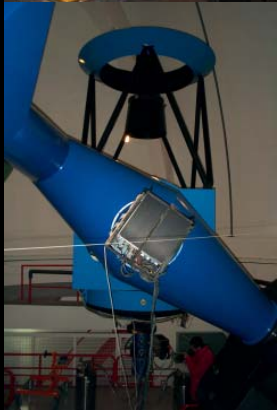
Santander (Spain), 15th-17th December 2004



Radio Monitoring of Lens Systems

Chris Fassnacht, UC Davis

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Radio Monitoring of Lens Systems

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Dana Nuccitelli

Leon Koopmans

David Rusin

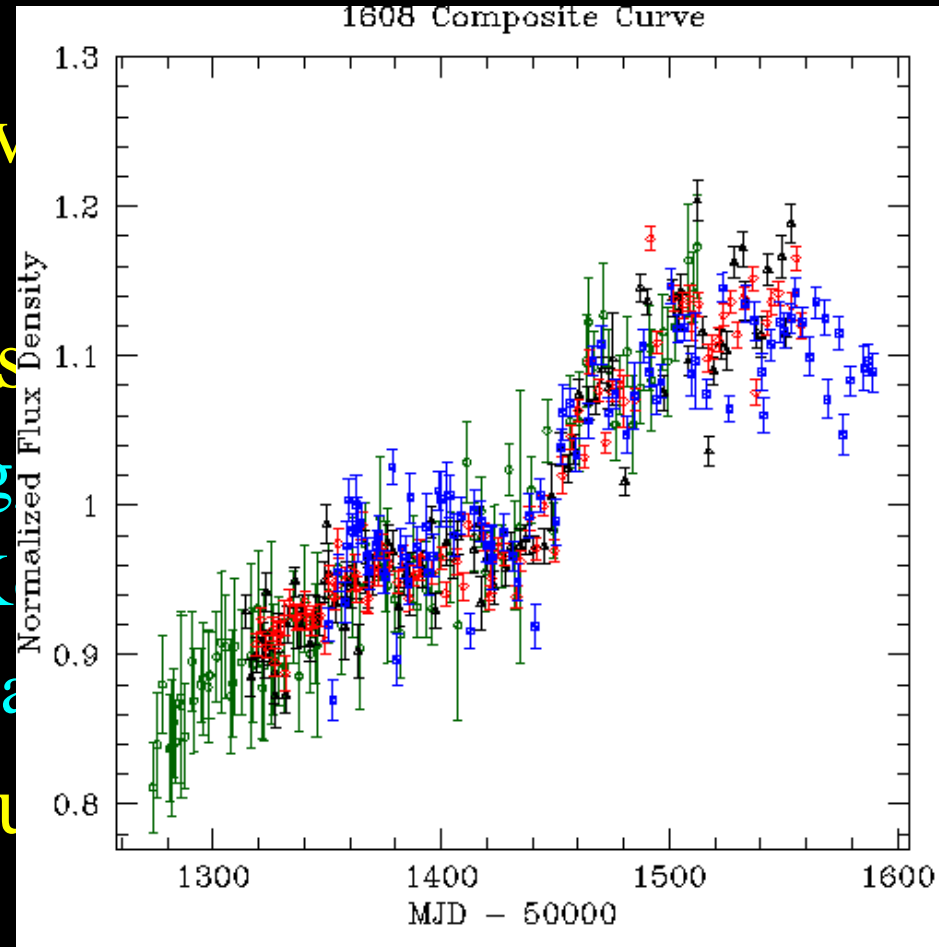
Emily Xanthopoulos

Motivation

- JVAS and CLASS surveys discovered 22 radio-loud lenses
- 3 have time delay measurements with VLA
 - JVAS B0218+357 (Biggs et al. 1999)
 - CLASS B1600+434 (Koopmans et al. 2000)
 - CLASS B1608+656 (Fassnacht et al. 1999, 2002)
- Monitor other radio-loud lenses

Motivation

- JVAS and CLASS surveys identify radio-loud lenses
- 3 have time delay measurements
 - JVAS B0218+357 (Big)
 - CLASS B1600+434 (K)
 - CLASS B1608+656 (F)
- Monitor other radio-loud lenses



Fassnacht et al. 2002

Monitoring Program

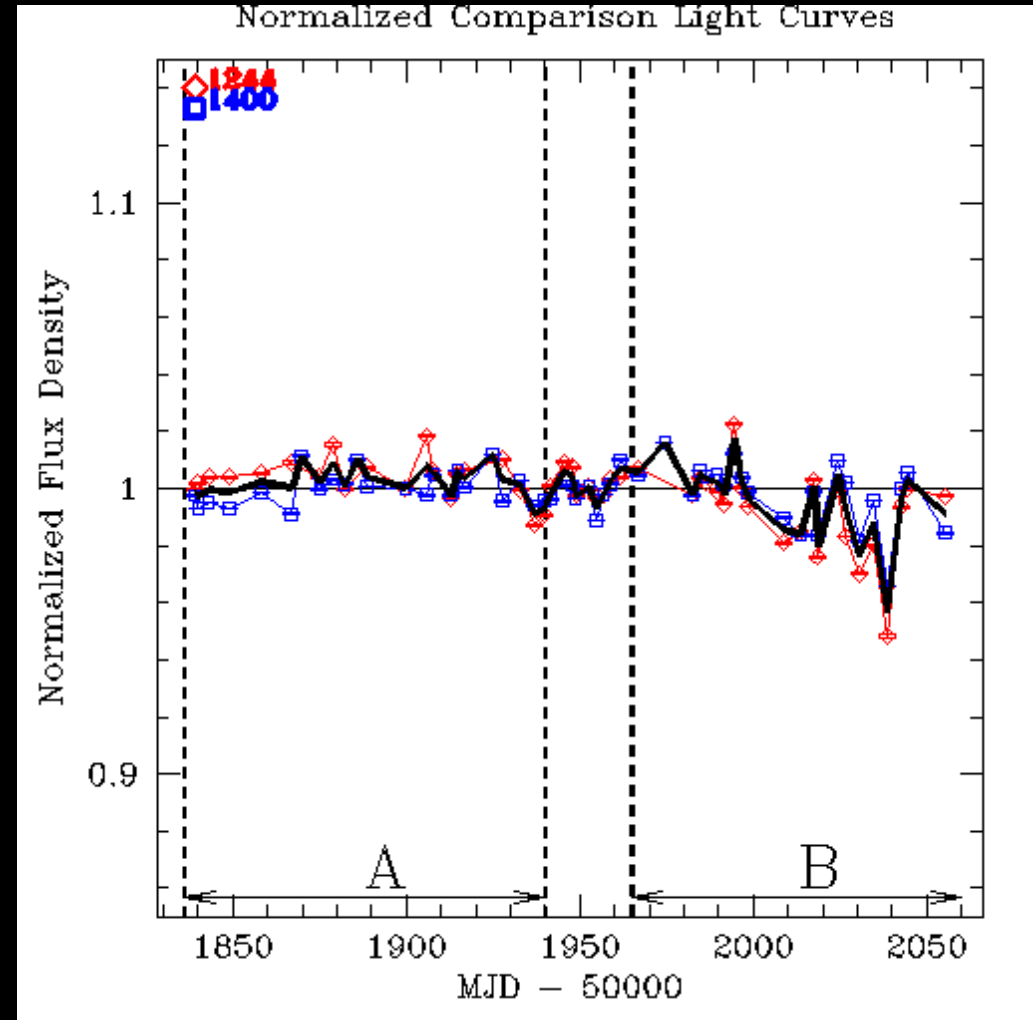
- Lenses observed during this program
 - MG 0414+0534
 - CLASS B0712+472
 - JVAS 1030+074
 - CLASS B1127+385
 - CLASS B1152+199
- Monitor with the VLA during A and B configuration
 - Angular resolution: 0.2→0.75 arcsec
 - Approximately 7 months: 2000 Nov. → 2001 May
 - Observed every ~ 4 days

Calibrator Sources

- Three compact symmetric objects observed as part of program
 - One used as primary flux calibrator
 - The other two used as secondary flux calibrators

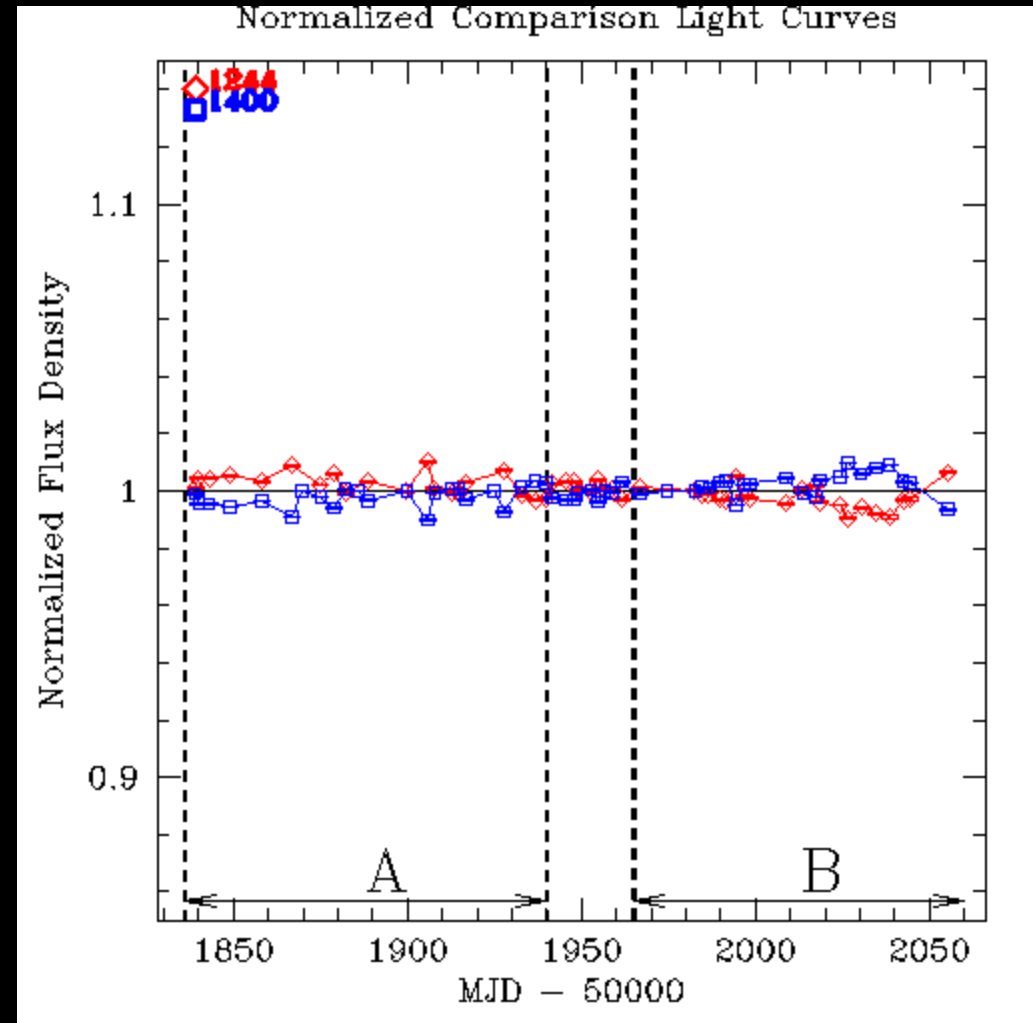
Calibrator Sources

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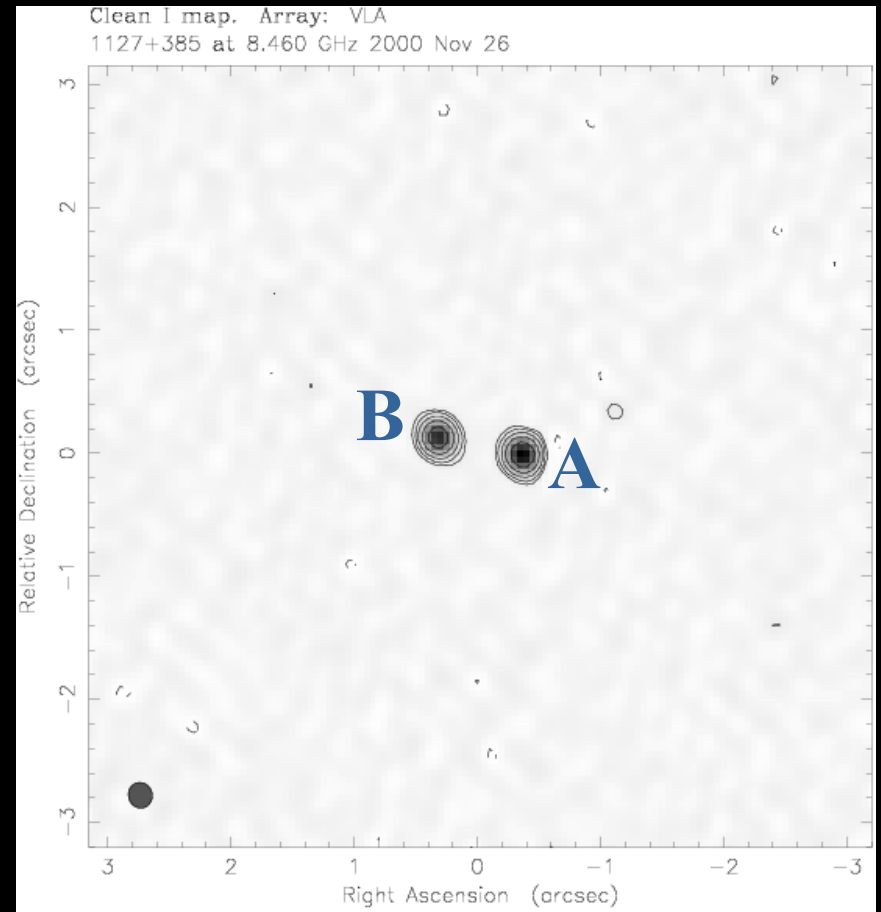
Calibrator Sources

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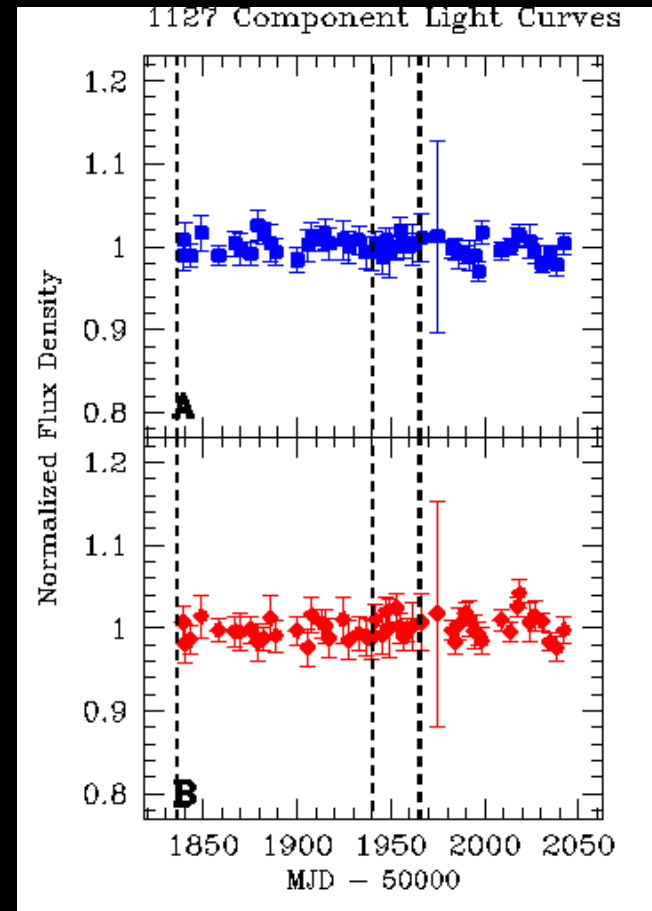
CLASS 1127+385

- $A = 9$ mJy
- $B = 7$ mJy



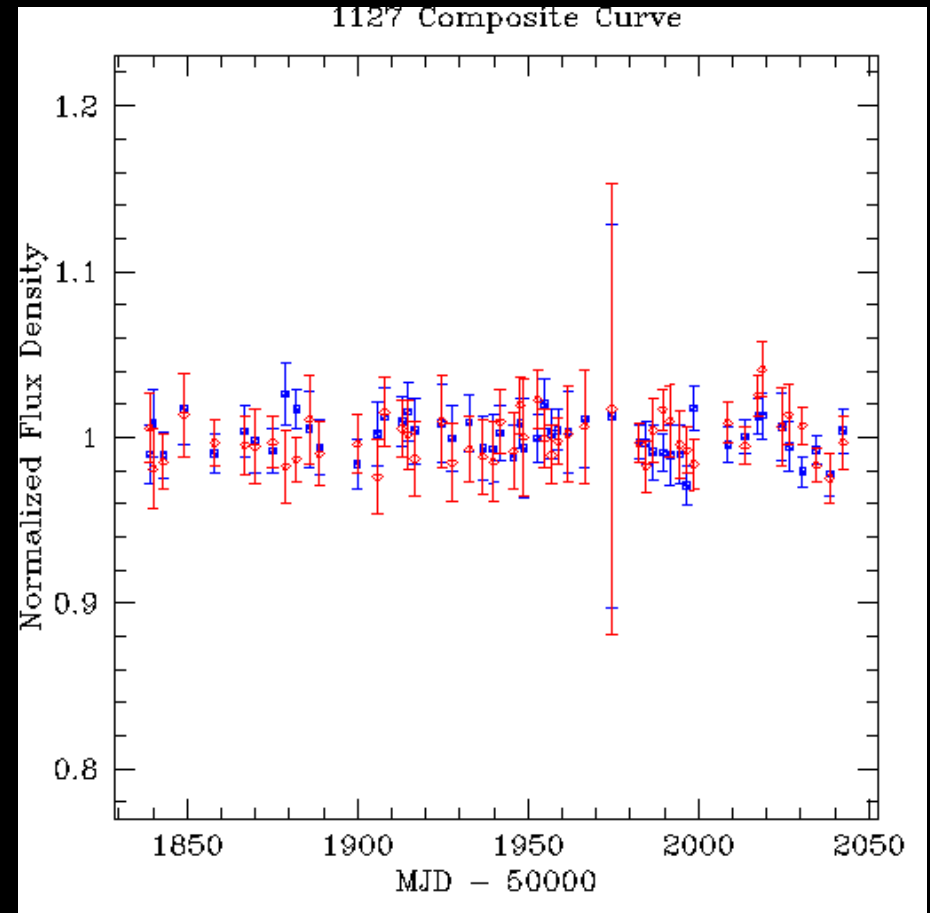
CLASS 1127+385

- 2-image lens
- No obvious variability



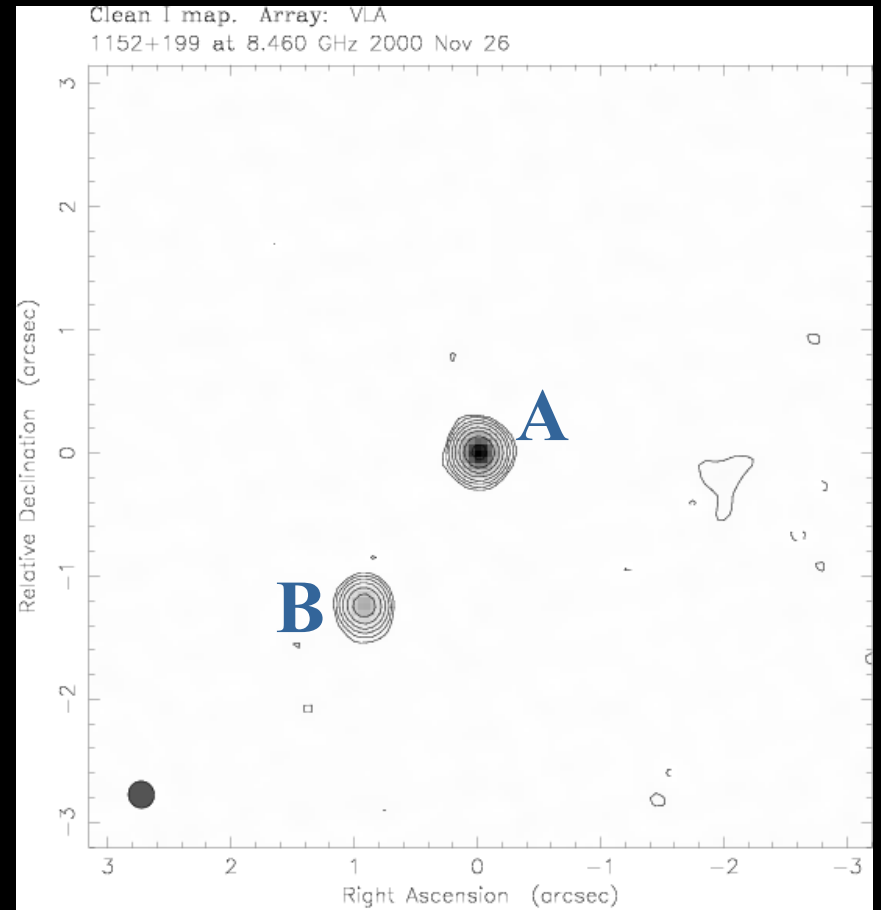
CLASS 1127+385

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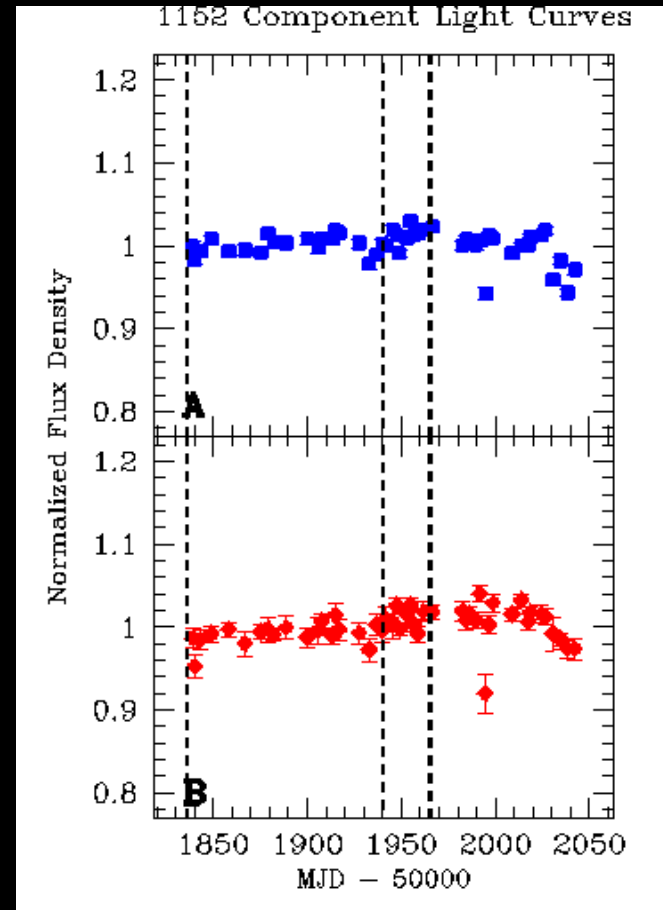
CLASS 1152+199

- $A = 49 \text{ mJy}$
- $B = 16 \text{ mJy}$



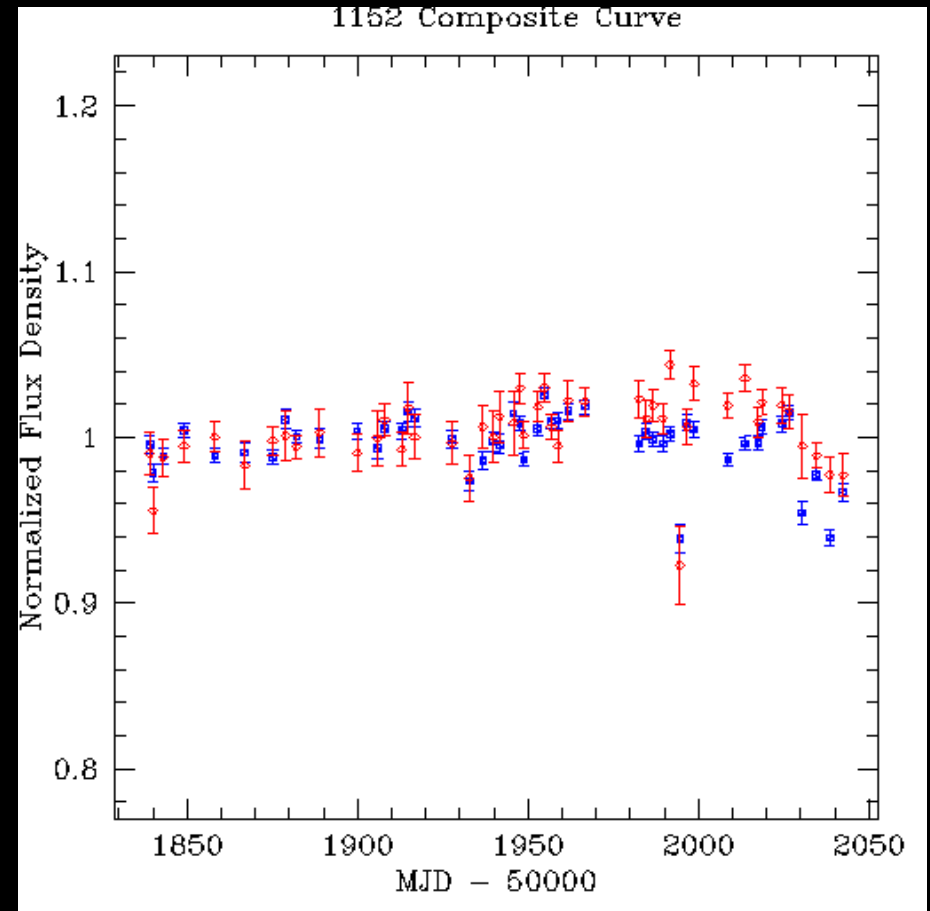
CLASS 1152+199

- 2-image lens
- Possible variability in component B (and A??)
- Time delay??
 - Needs testing



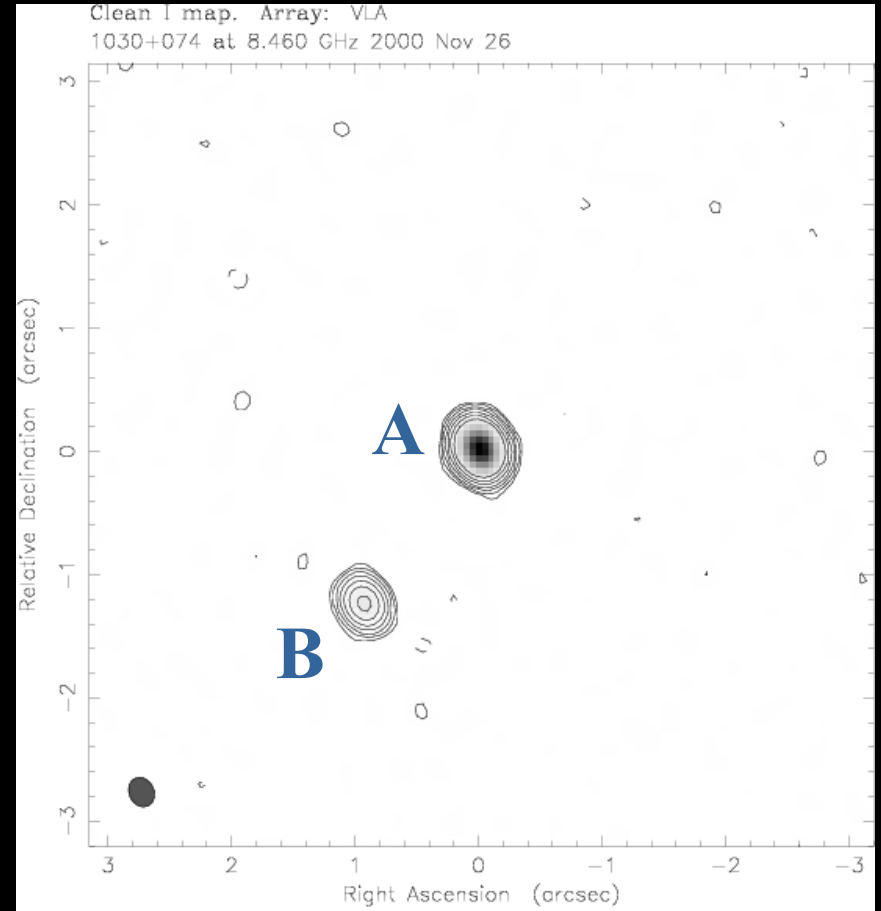
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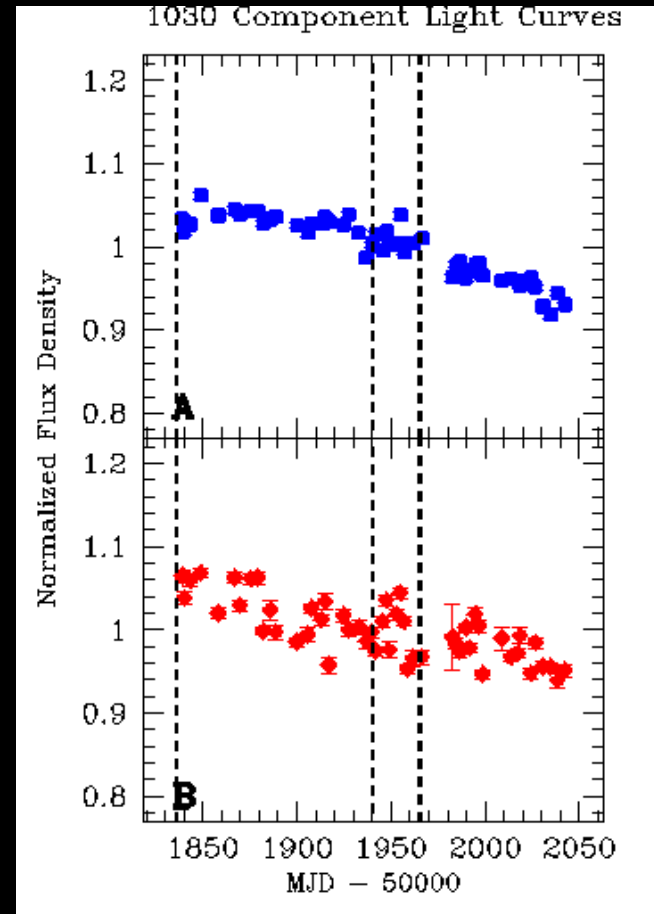
JVAS B1030+074

- $A = 354 \text{ mJy}$
- $B = 30 \text{ mJy}$



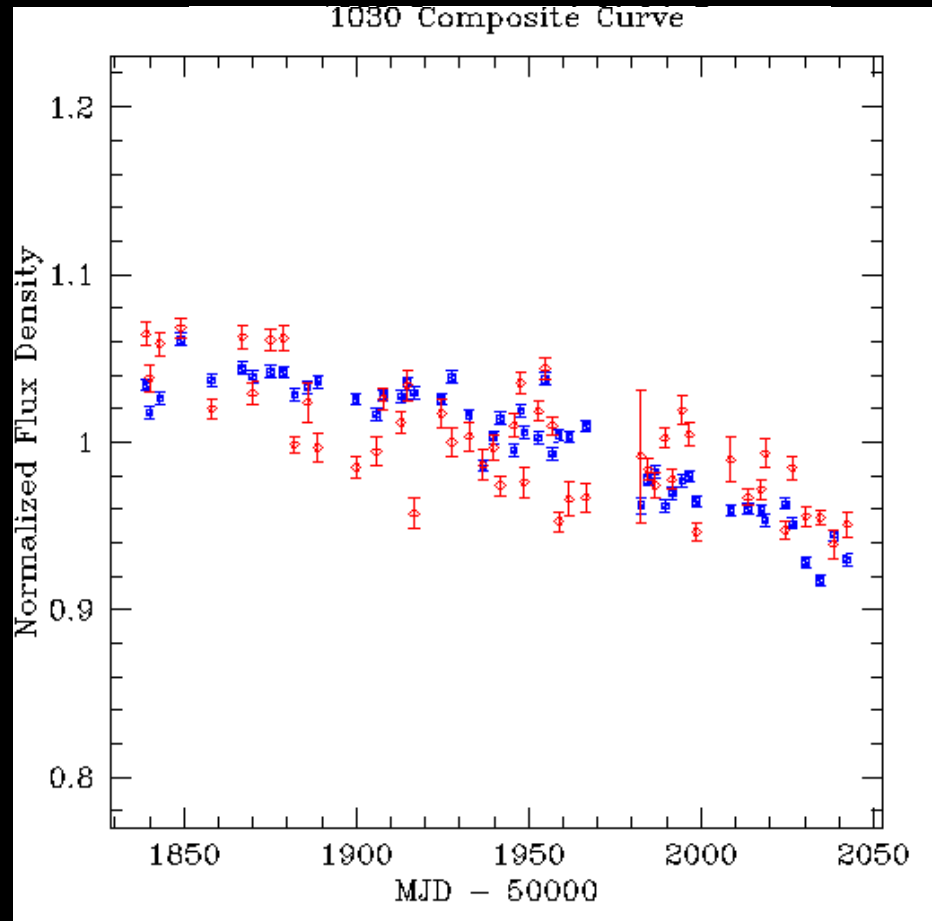
JVAS B1030+074

- 2-image lens
- Steady decline
- Short-scale variability in B?
- No clear delay

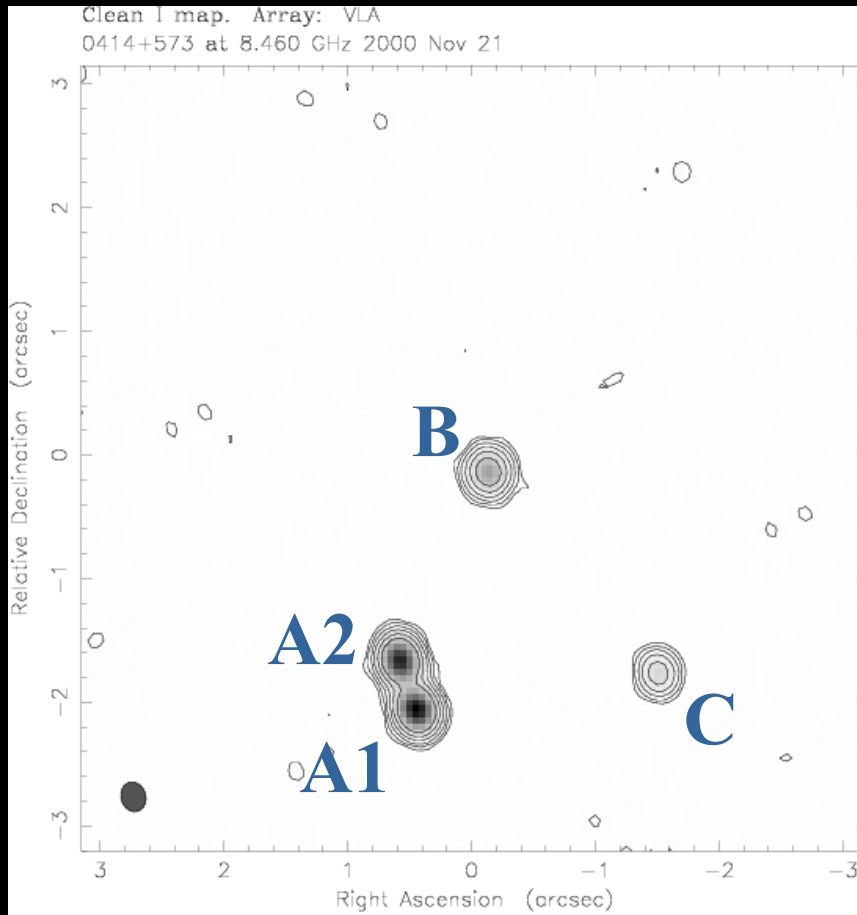


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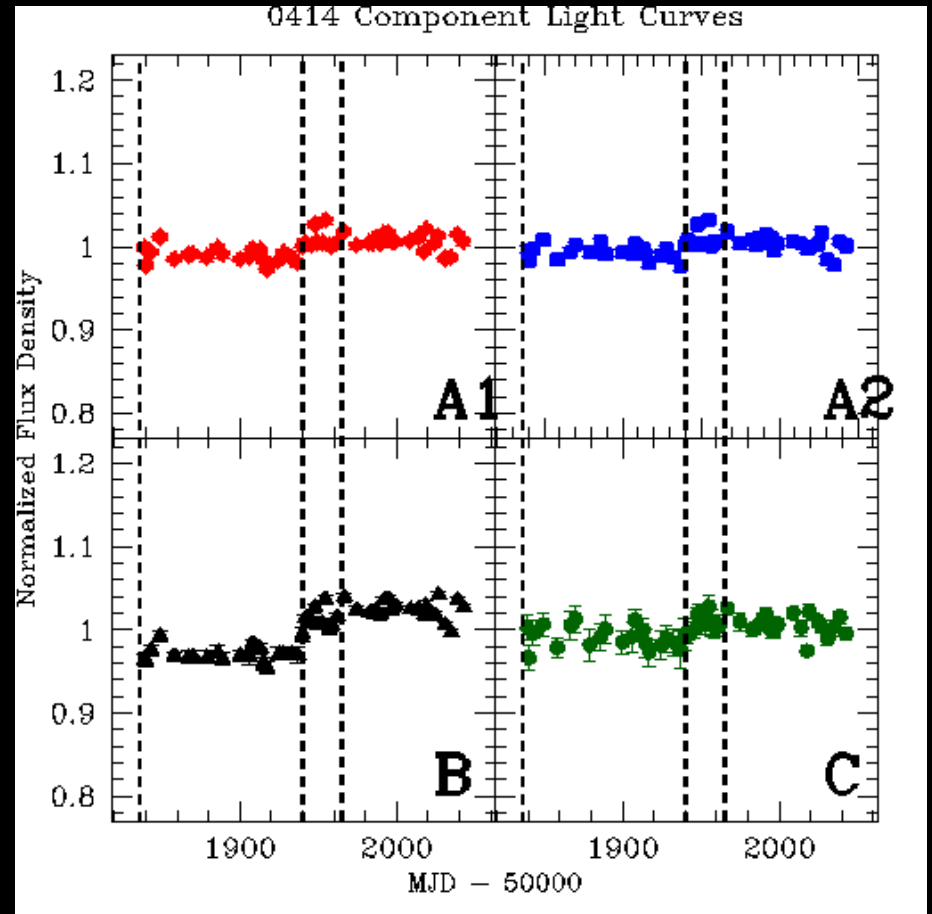
MG 0414+0534



- A1 = 188 mJy
- A2 = 167 mJy
- B = 71 mJy
- C = 28 mJy

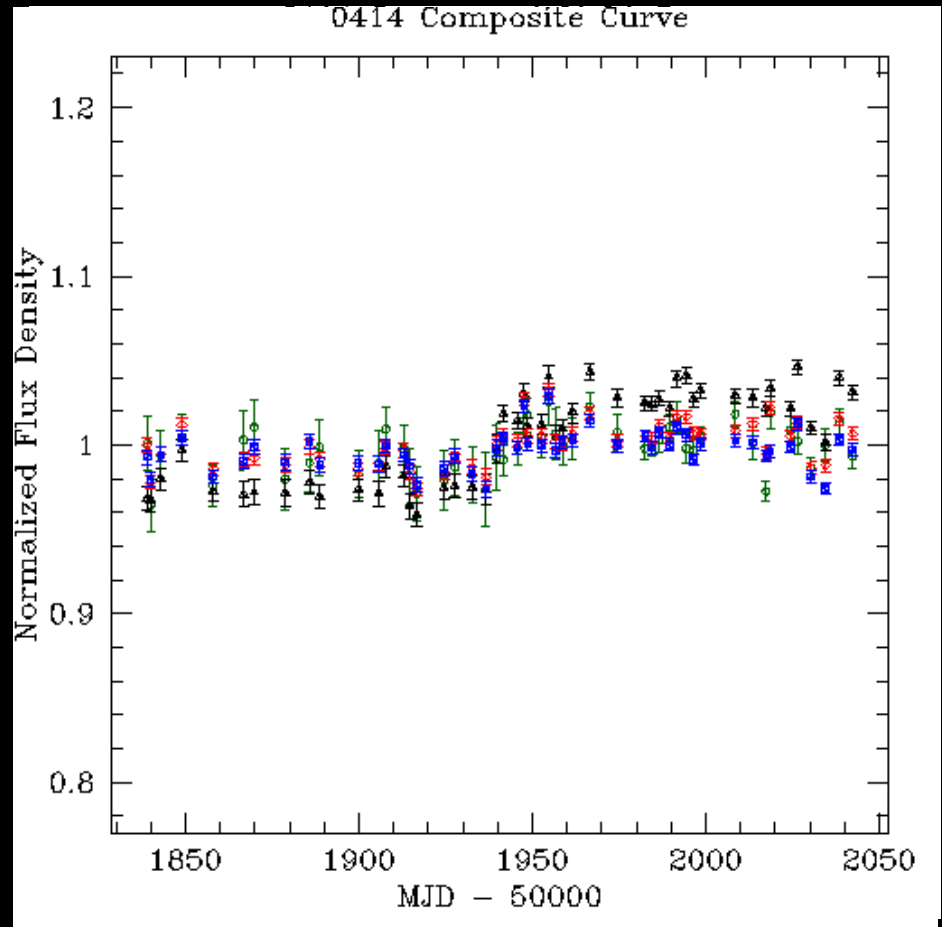
MG 0414+0534

- 4-image lens
- Possible variability in component B
- Slightly suspicious timing

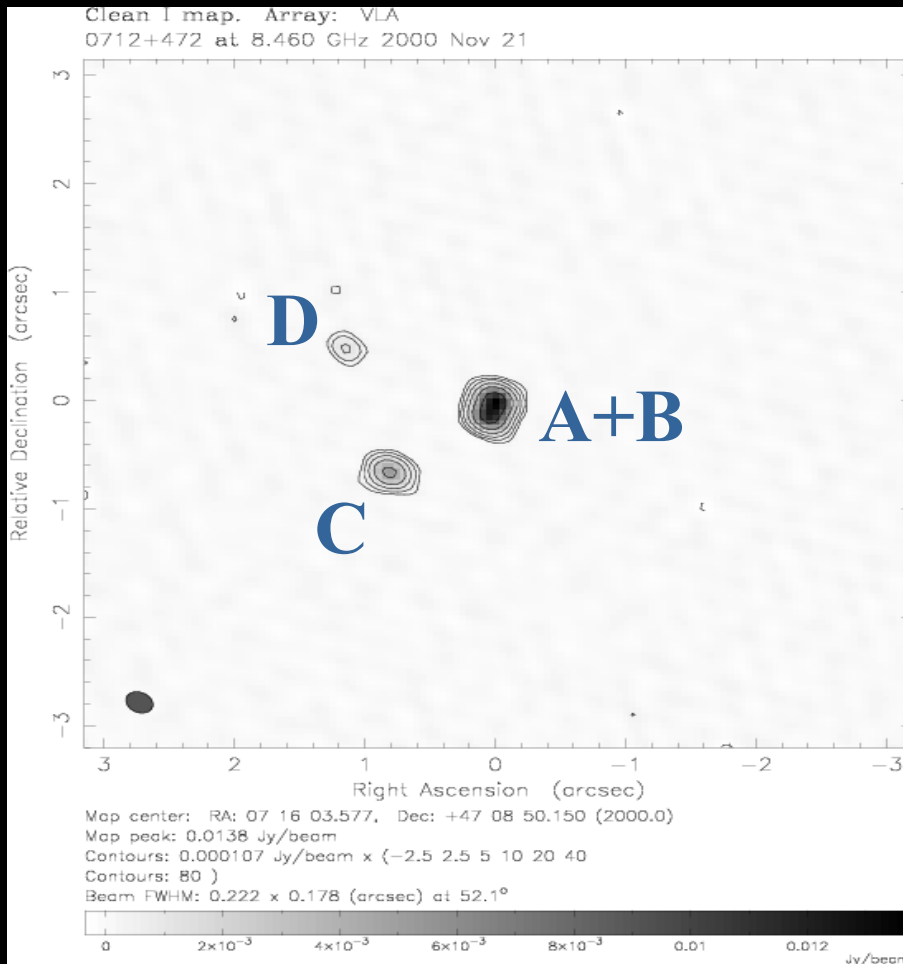


MG 0414+0534

- 4-image lens
- Possible variability in component B
- Slightly suspicious timing



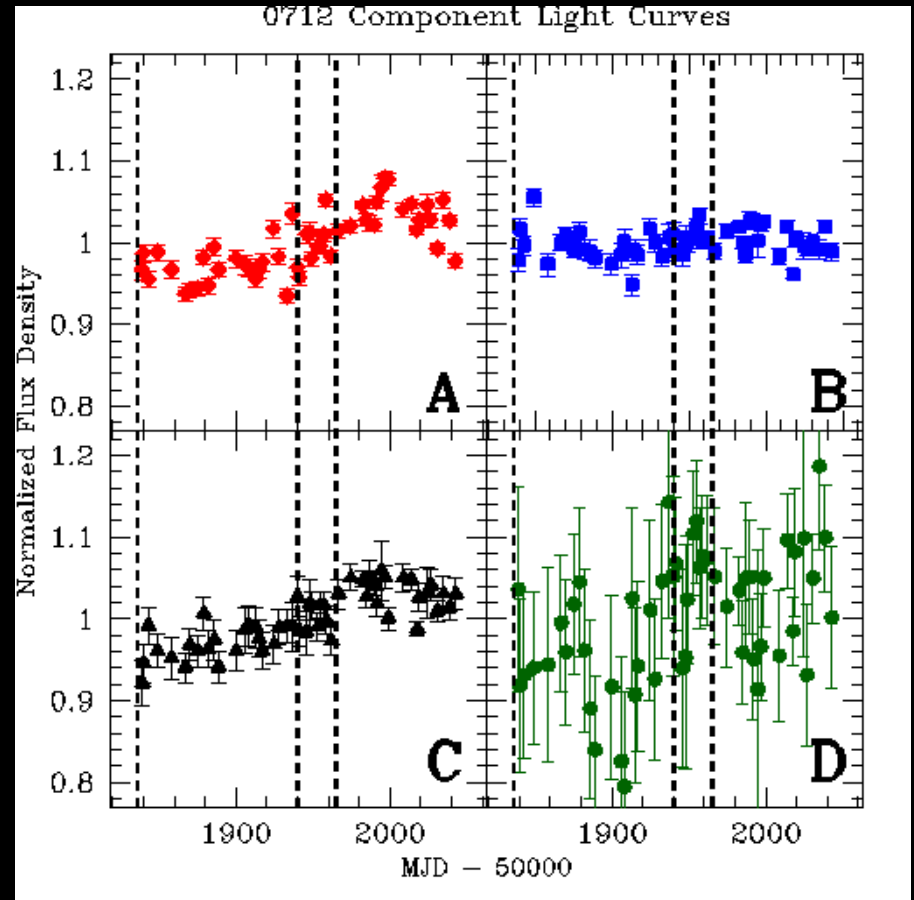
CLASS B0712+472



- A = 13 mJy
- B = 11 mJy
- C = 6 mJy
- D = 1 mJy
- Components A and B partially blended even in A configuration

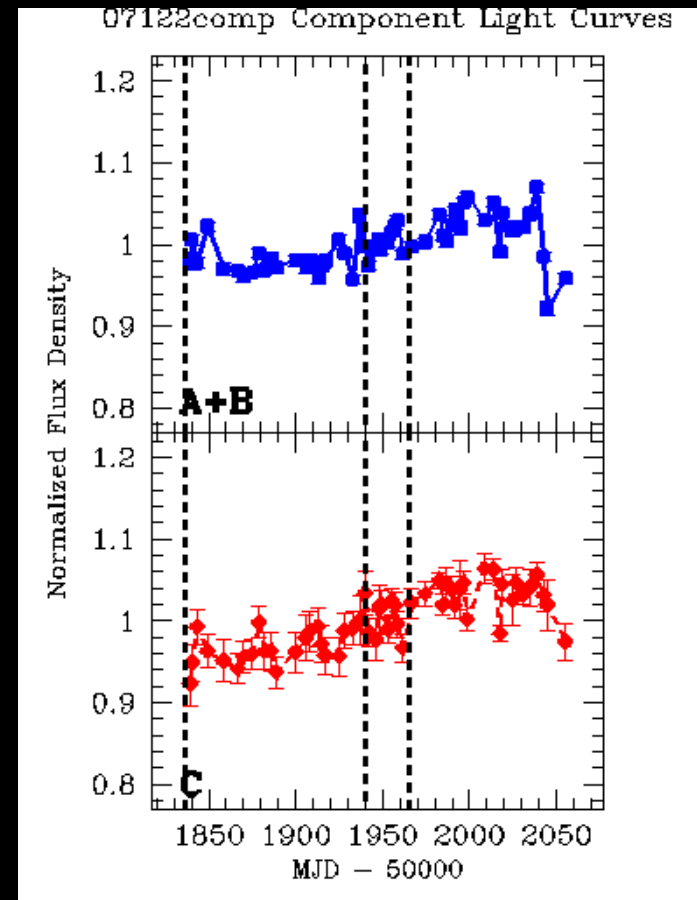
CLASS B0712+472

- 4-image lens
- Possible variability in components A and C
- Component D is too faint



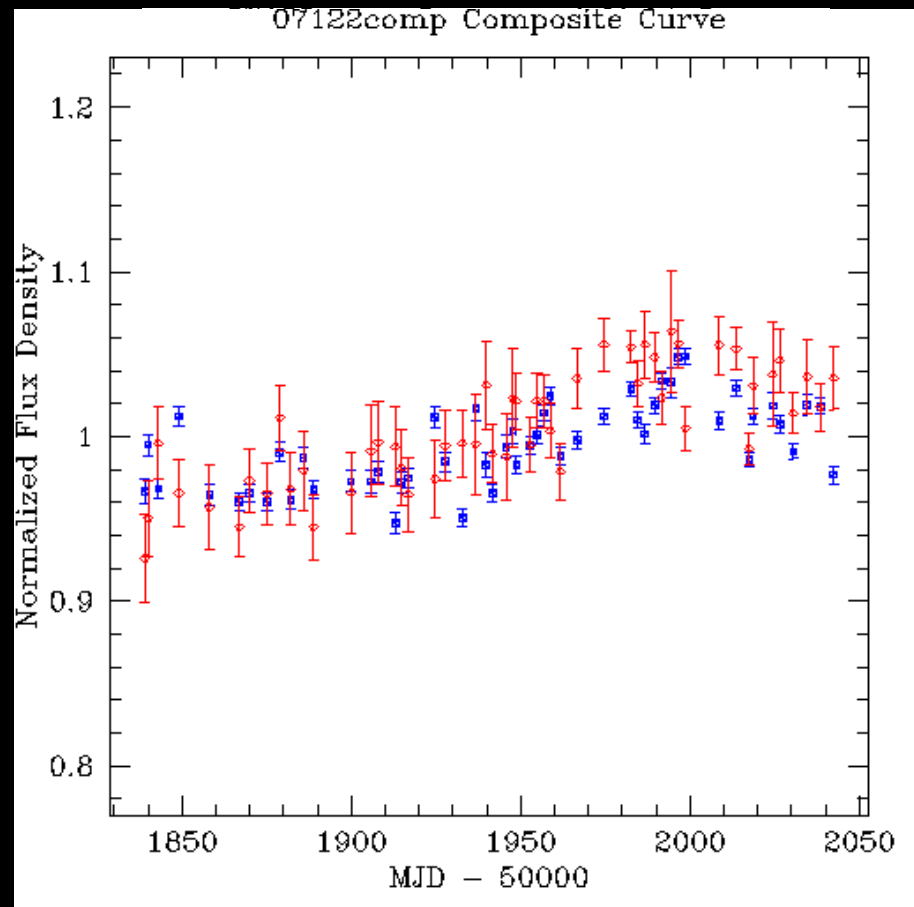
CLASS B0712+472

- Add A+B and drop D
- Hint of a delay \rightarrow search with Pelt et al. dispersion method
- Minimum at ~ 10 d
- Scintillation? (Koopmans et al.)



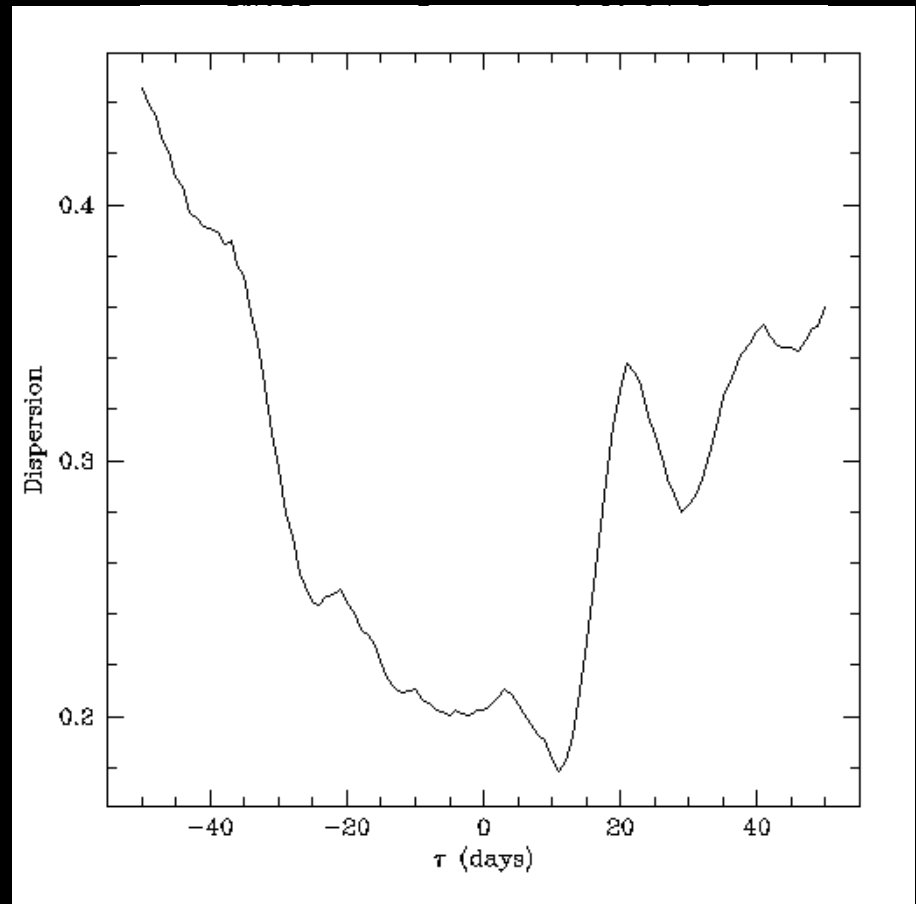
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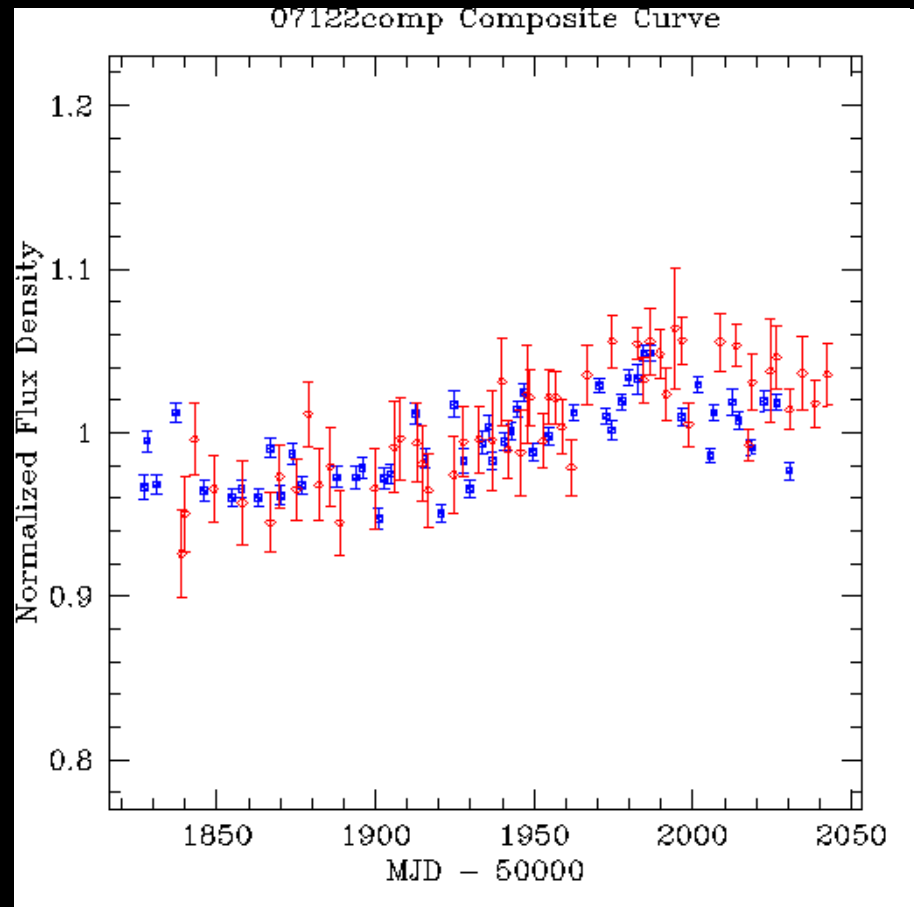
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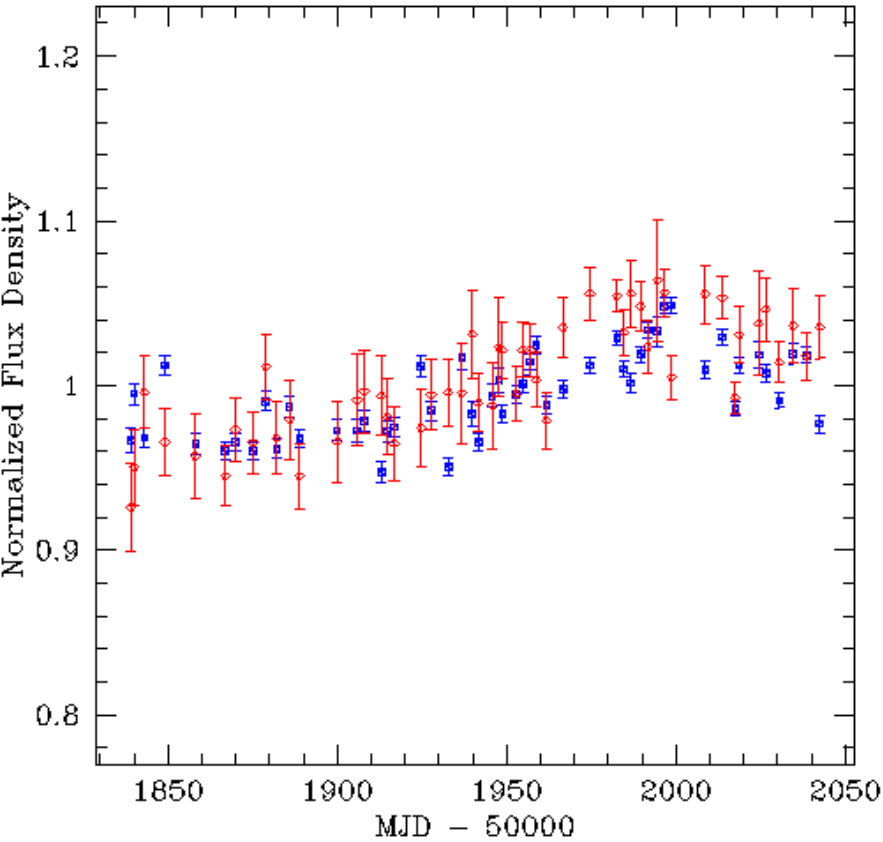
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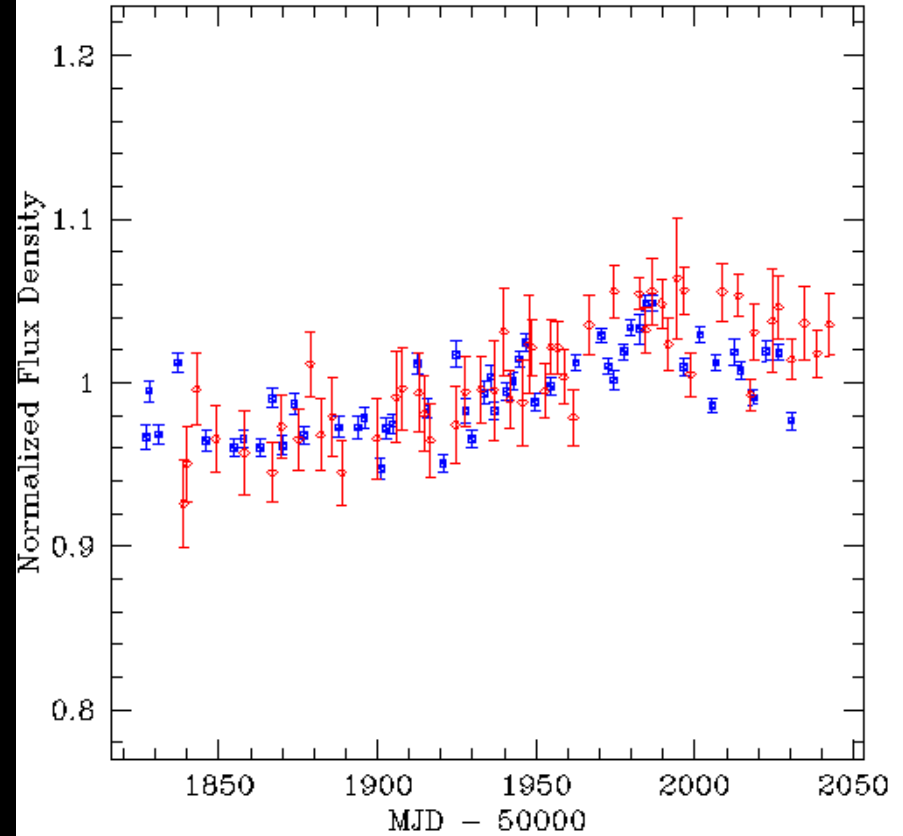
CLASS B0712+472

07122comp Composite Curve



dt = 0 days

07122comp Composite Curve



dt = 11 days

Summary & Future Work

- **Summary**
 - 1 lens shows no variability
 - 2 show possible variability in one component
 - 1 shows clear variability in both components but no obvious delay
 - 1 shows variability from which a possible time delay has been measured
- **Future Work**
 - Understand behavior of calibrator sources at end of program
 - Further testing of robustness of time delay measurement in CLASS B0712+472 (and 1152+199?)