MAX-PLANCK-GESELLSCHAFT

Max-Planck-Institut
für Radioastronomie

The Radio Flare in the Jet of CTA 102

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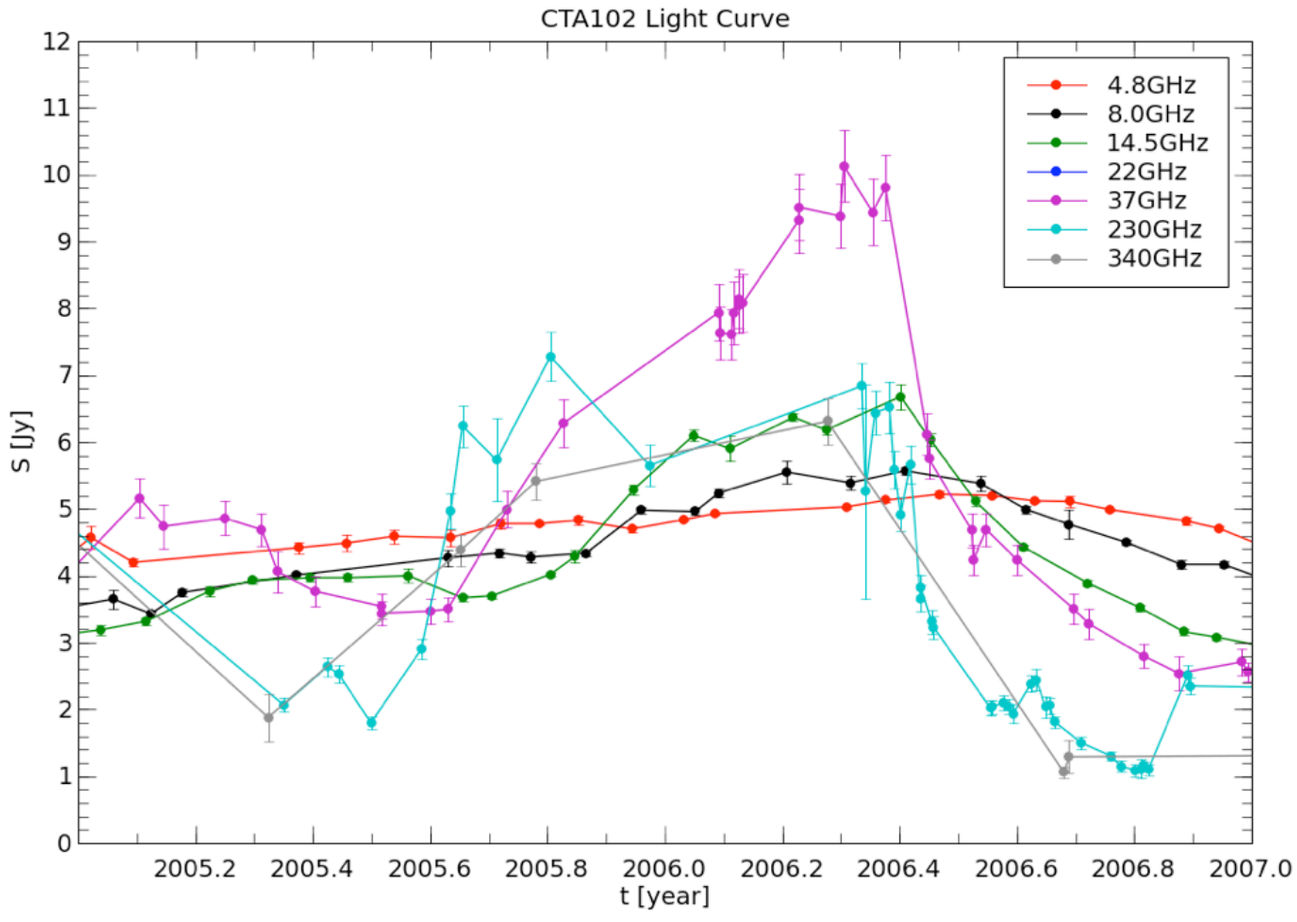
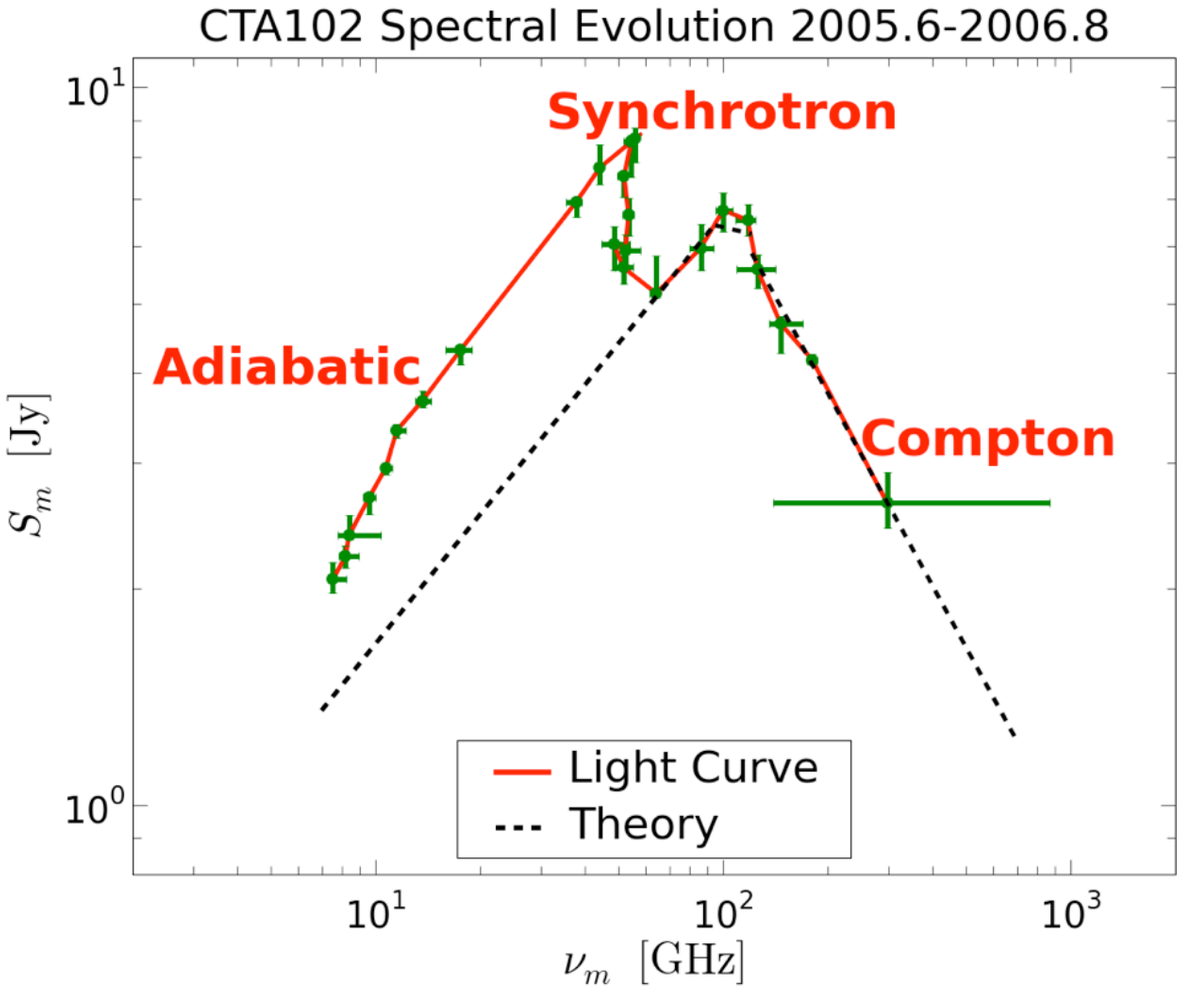
IMPRS astronomy & astrophysics Bonn and Cologne

Single-Dish Observations





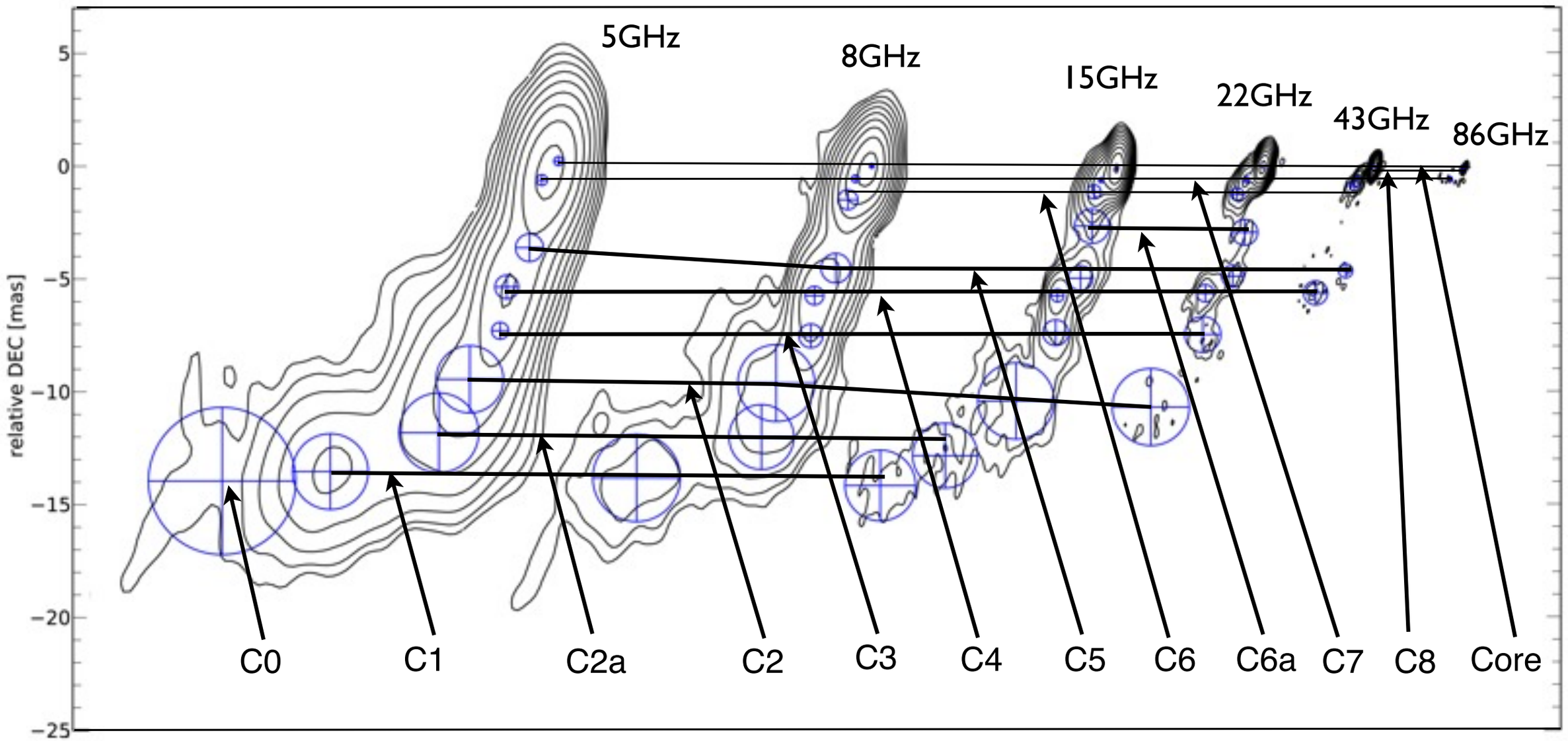
UMRAO: H. Aller & M. Aller, 2009, priv. comm.

Metsähovi: Teräsranta et al. 2005, A. Lähteenmäki, 2009, priv. comm.

SMA: M. Gurwell, 2009, priv. comm.

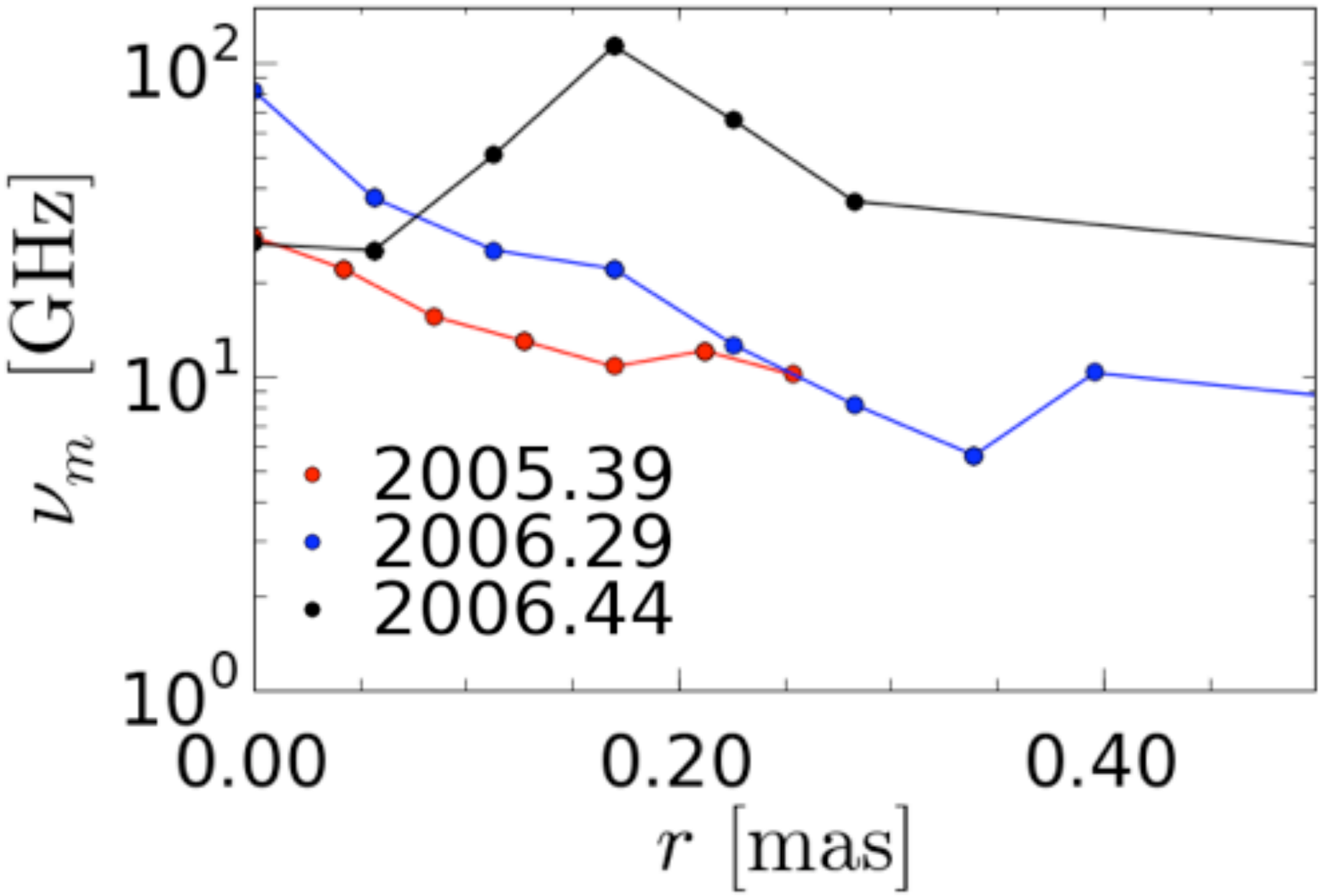
Multi-Freq. VLBI (2 - 86 GHz)

Epoch 2005.39

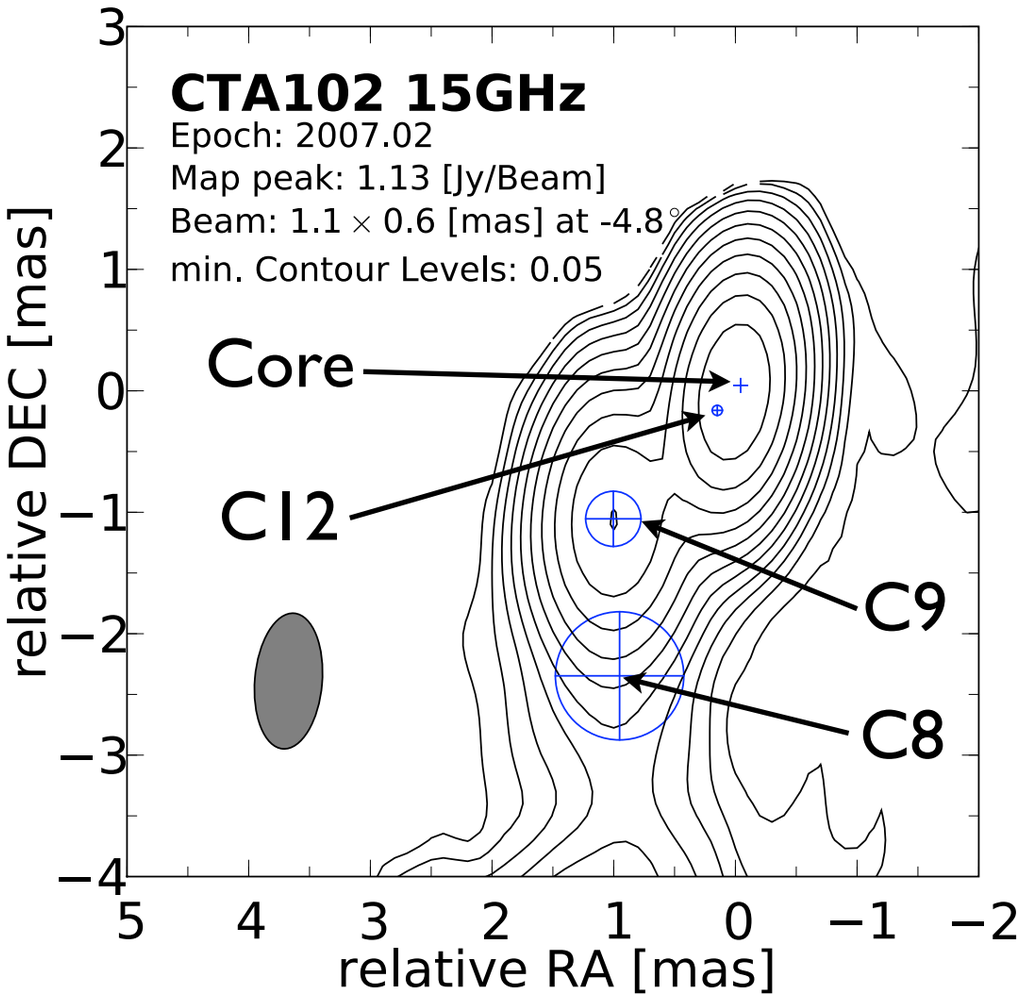


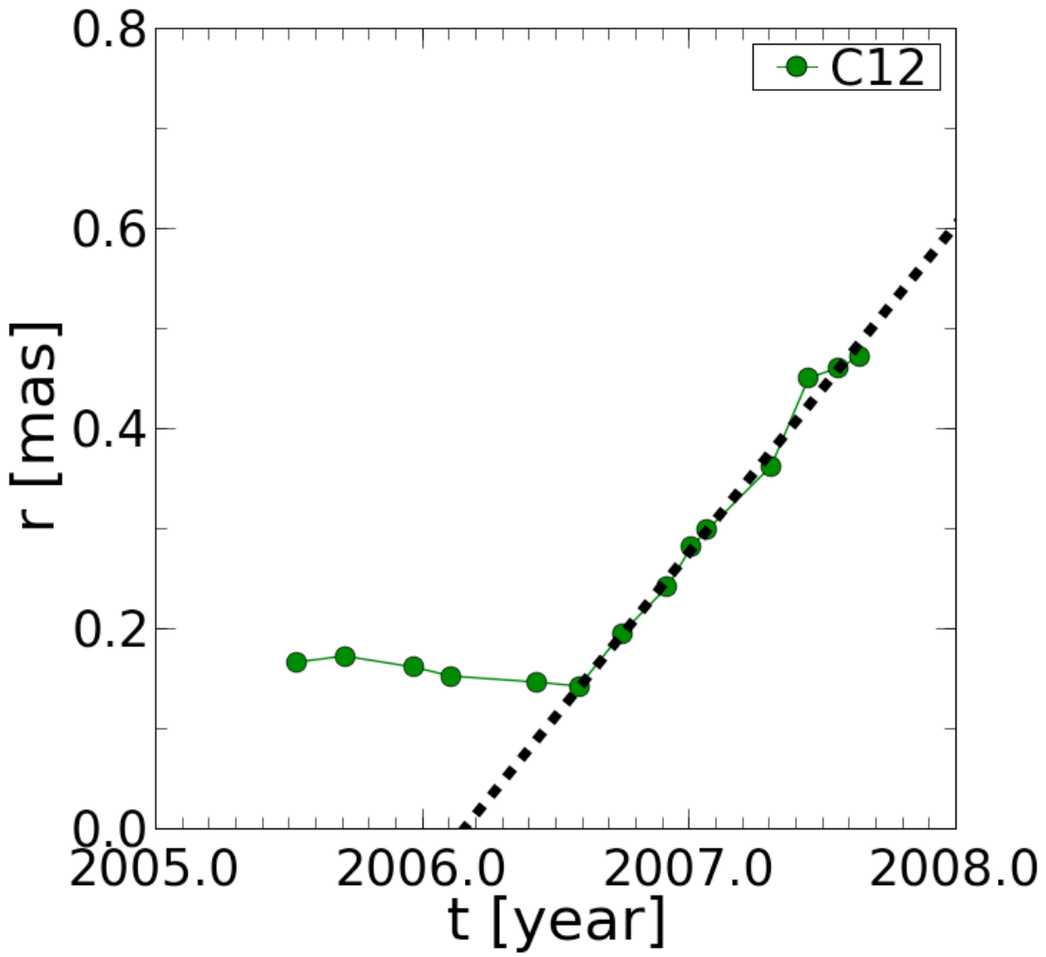
Multi-Freq. VLBI (2 - 86 GHz)

Turnover Freq. vs. distance from Core



15 GHz MOJAVE Kinematics

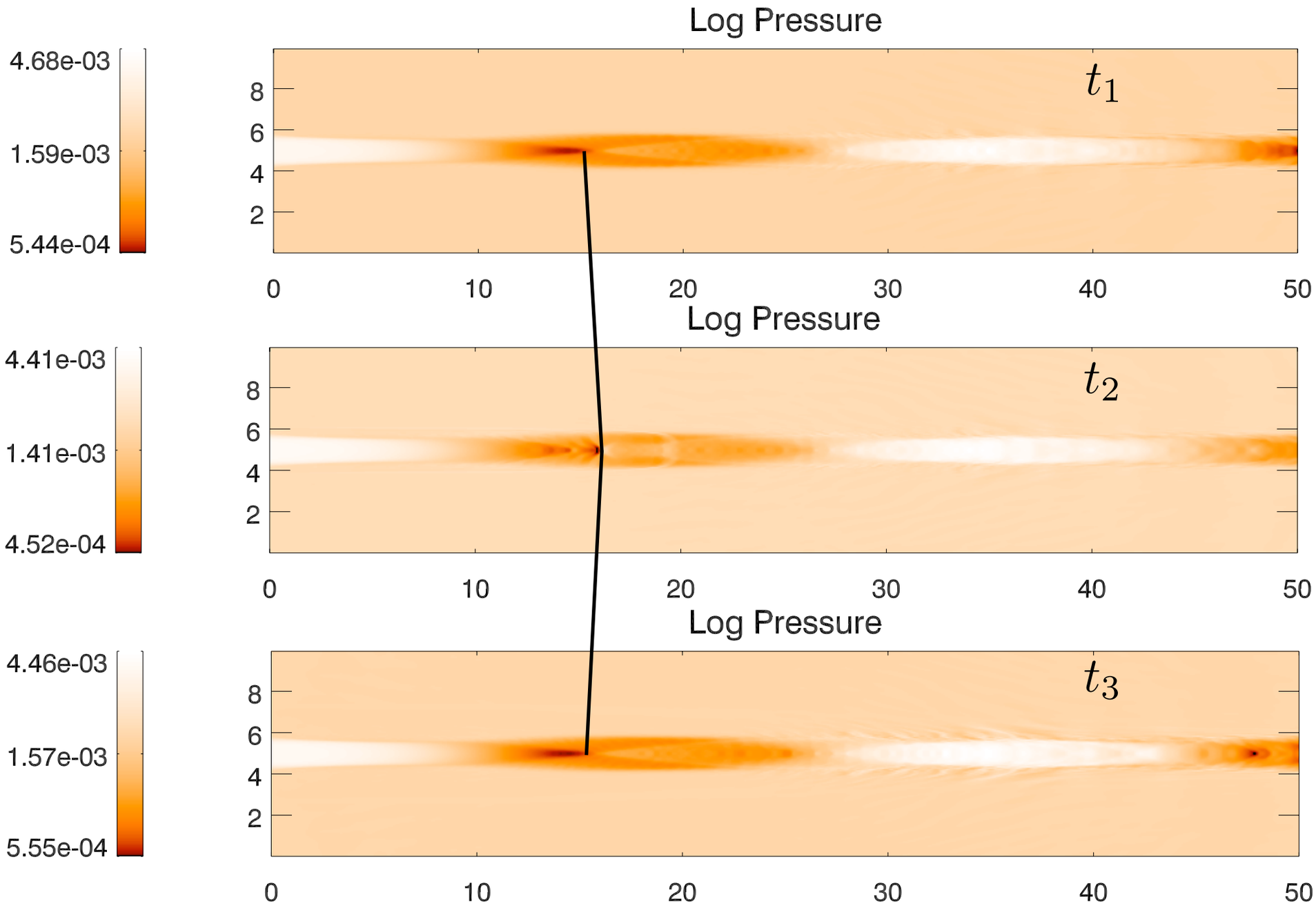




$$
\begin{aligned}
t &= 2005.83 \pm 0.05\,\mathrm{yr} \\
v &= 327 \pm 13\,\mu\mathrm{as\,yr}^{-1} \\
\beta_{\mathrm{app}} &= 17.3 \pm 0.7\,c
\end{aligned}
$$

Ref: Lister et al. (2009), Fromm et al. (2009), Ros, priv. comm.

RHD Simulations



$$\Delta t \approx 7\,\mathrm{yr}$$

Conclusions

- The results of the observations and the simulations lead to the picture that the 2006 radio flare in CTA102 can be associated with a traveling shock-standing shock interaction.
- The approach of combining single-dish, VLBI (monitoring and multi-freq) observations and simulations is a powerful approach towards an understanding of these high energetic events.
- To confirm our assumptions further observational analysis and relativistic (emission-) magneto-hydrodynamic simulations are needed.