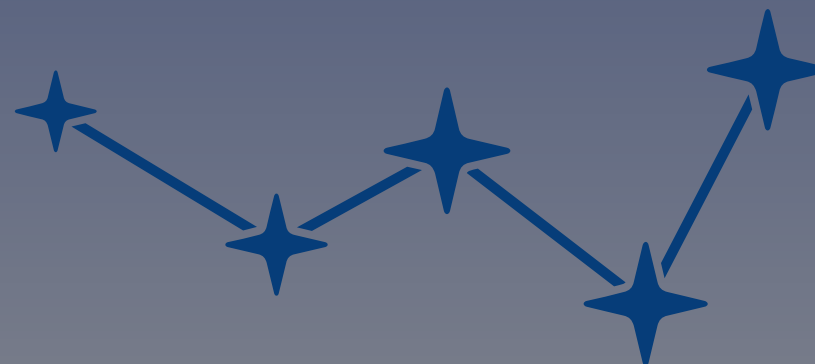


VLBI Jet Kinematics of the TeV Blazar Mrk 421

Sarah M. Wagner

Matthias Kadler, Talvikki Hovatta, Kevin Schmidt, Paul Ray Burd



ASTRO WÜRZBURG

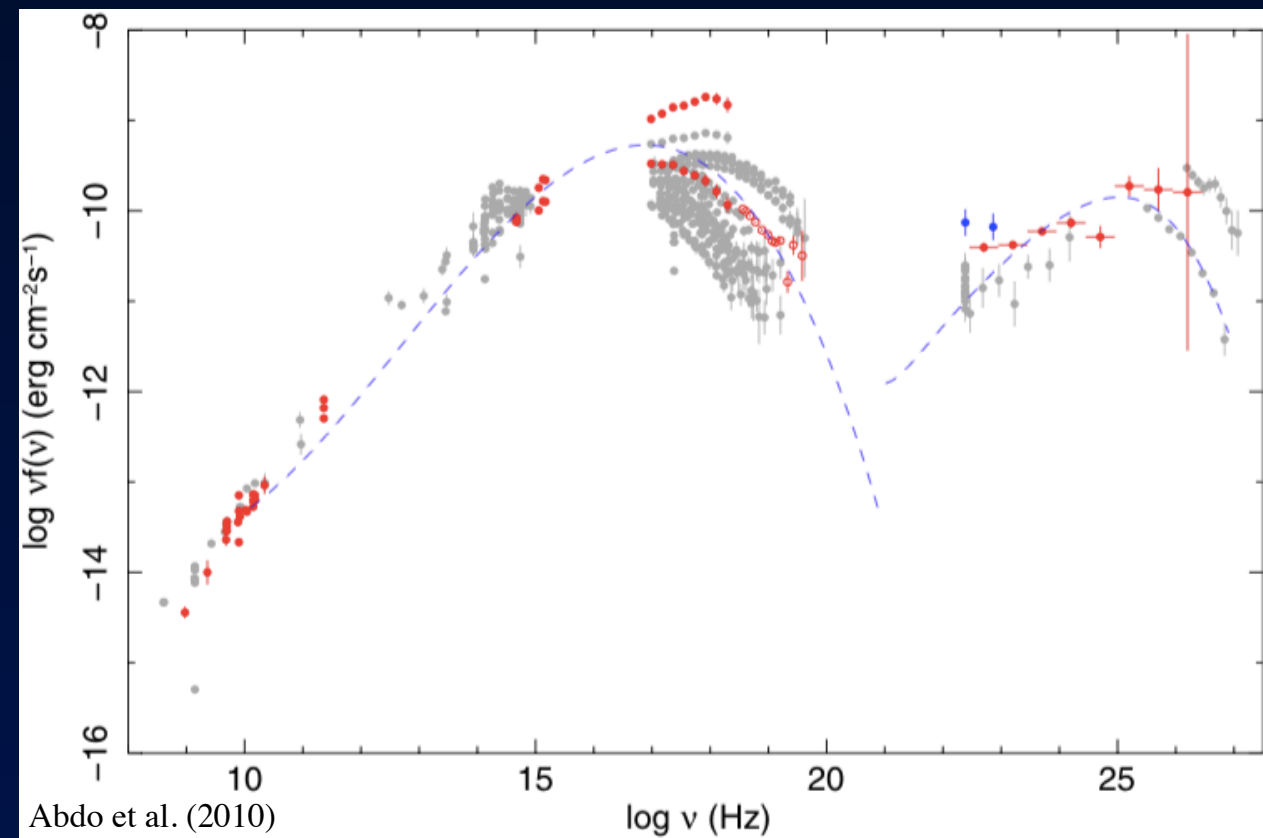
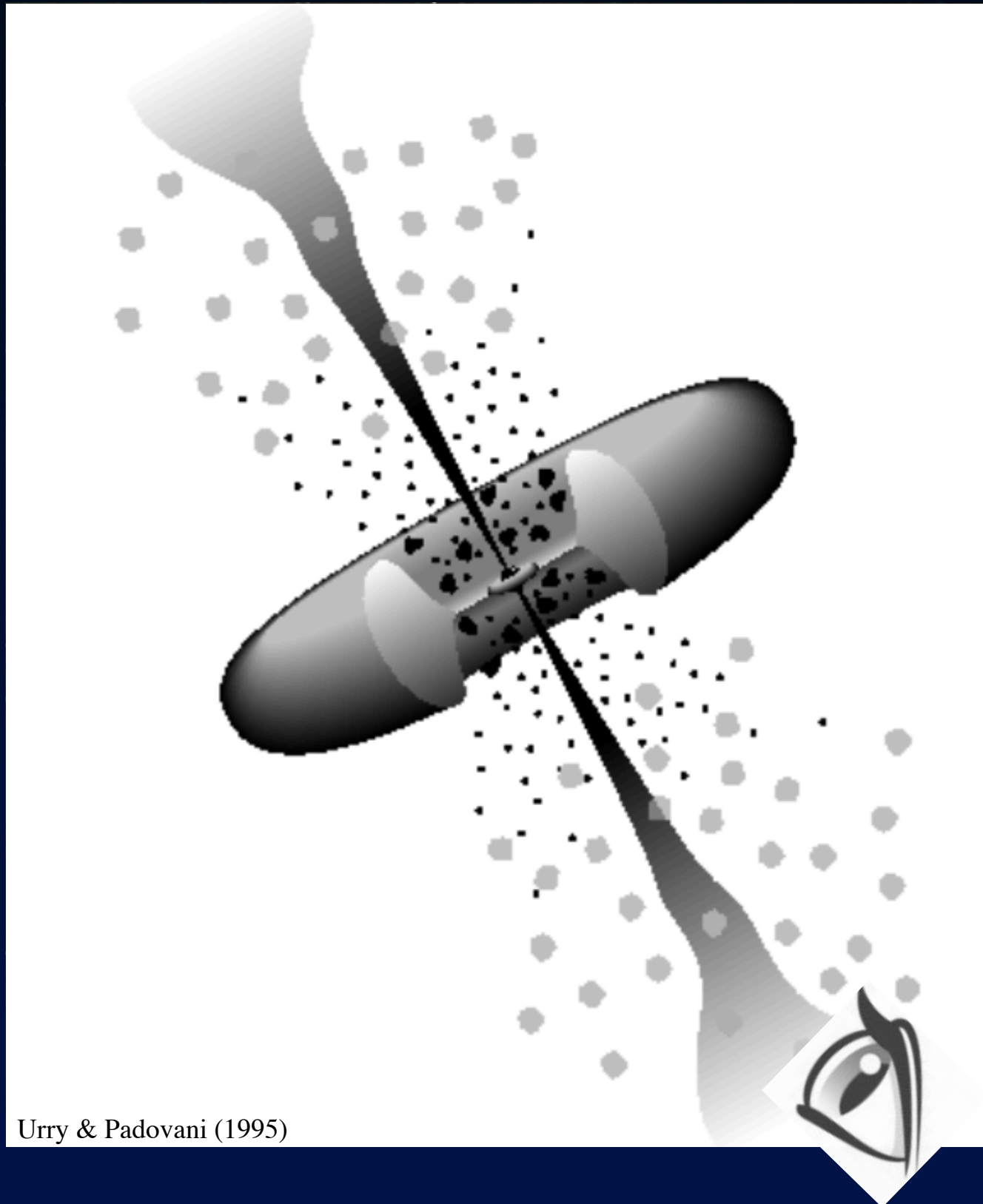
Monitoring the non-thermal Universe 2018

Active Galactic Nuclei and Blazars

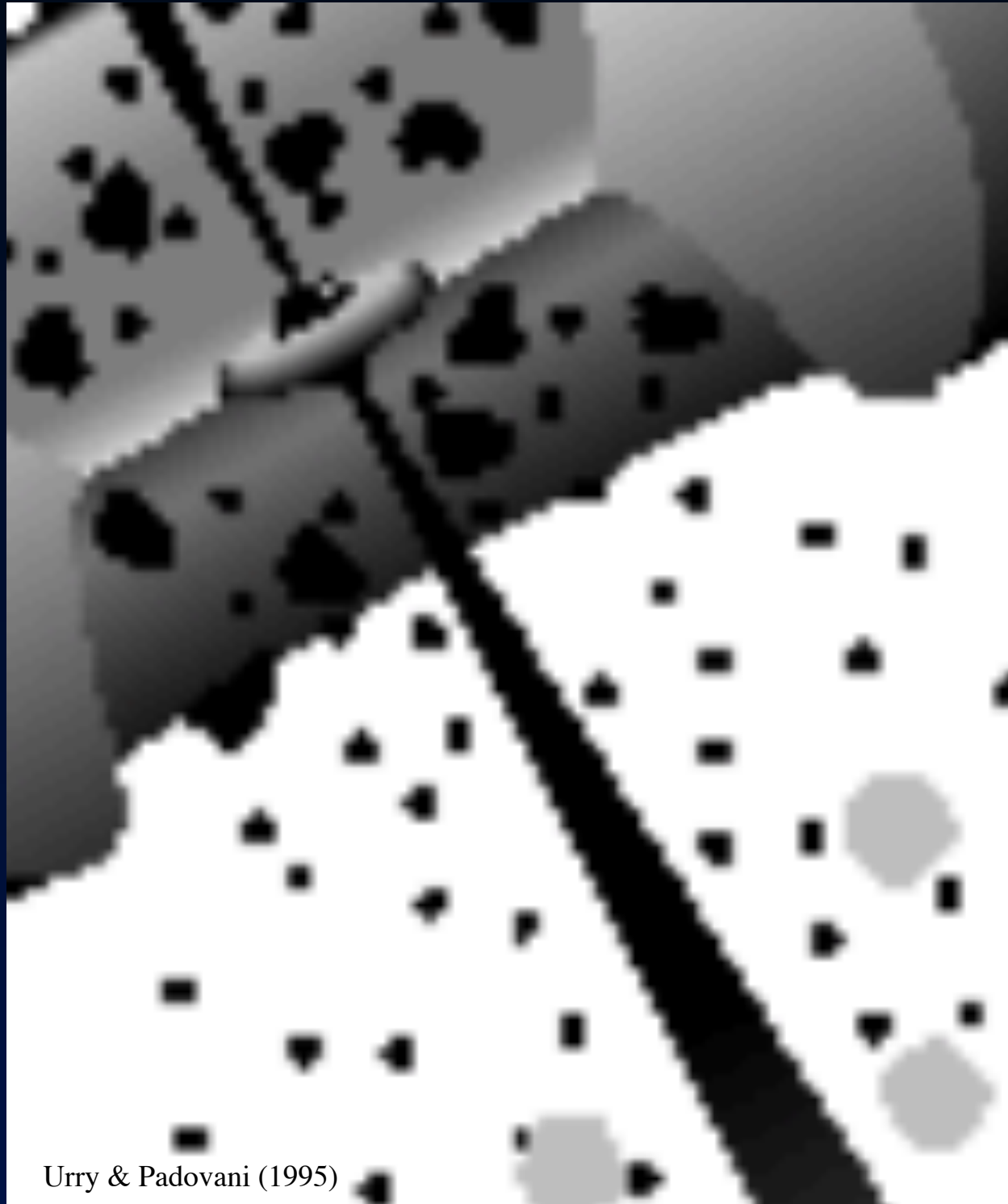


AGN
↓
Blazar
↓
BL Lac

Active Galactic Nuclei and Blazars

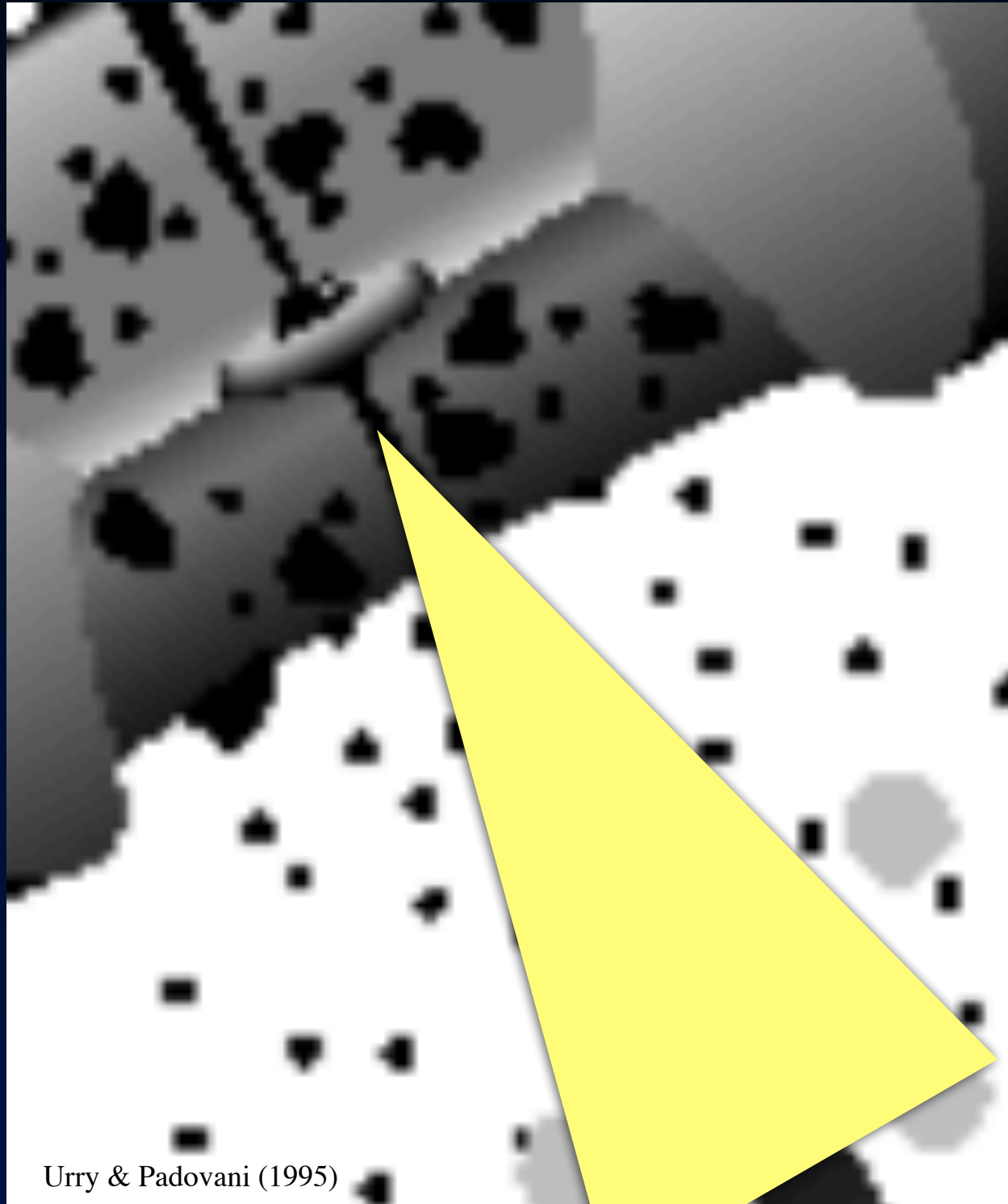


Jet Structure



Marscher & Gear (1985):
Flare of 3C 273

Jet Structure

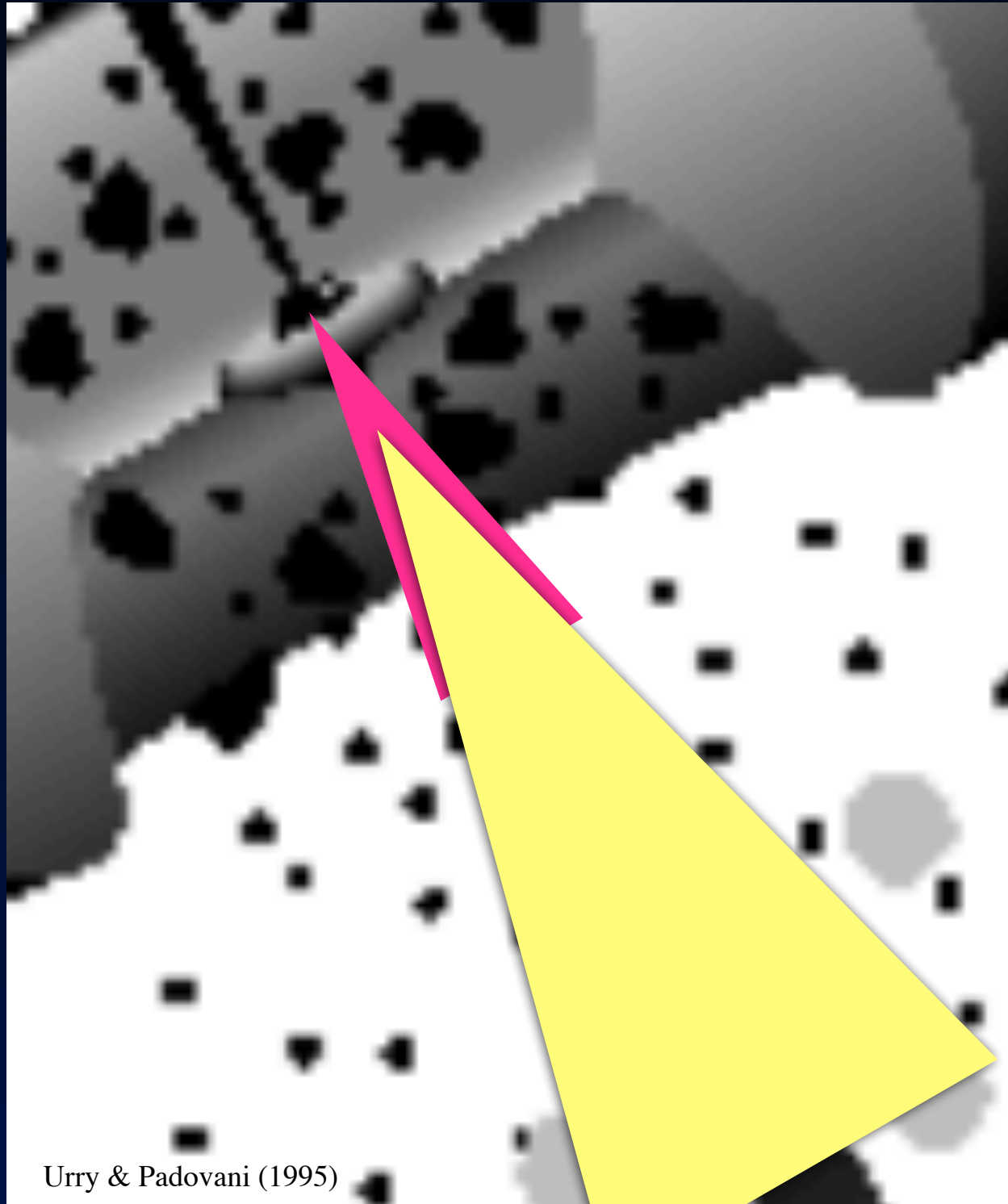


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- conical jet structure

Urry & Padovani (1995)

Jet Structure

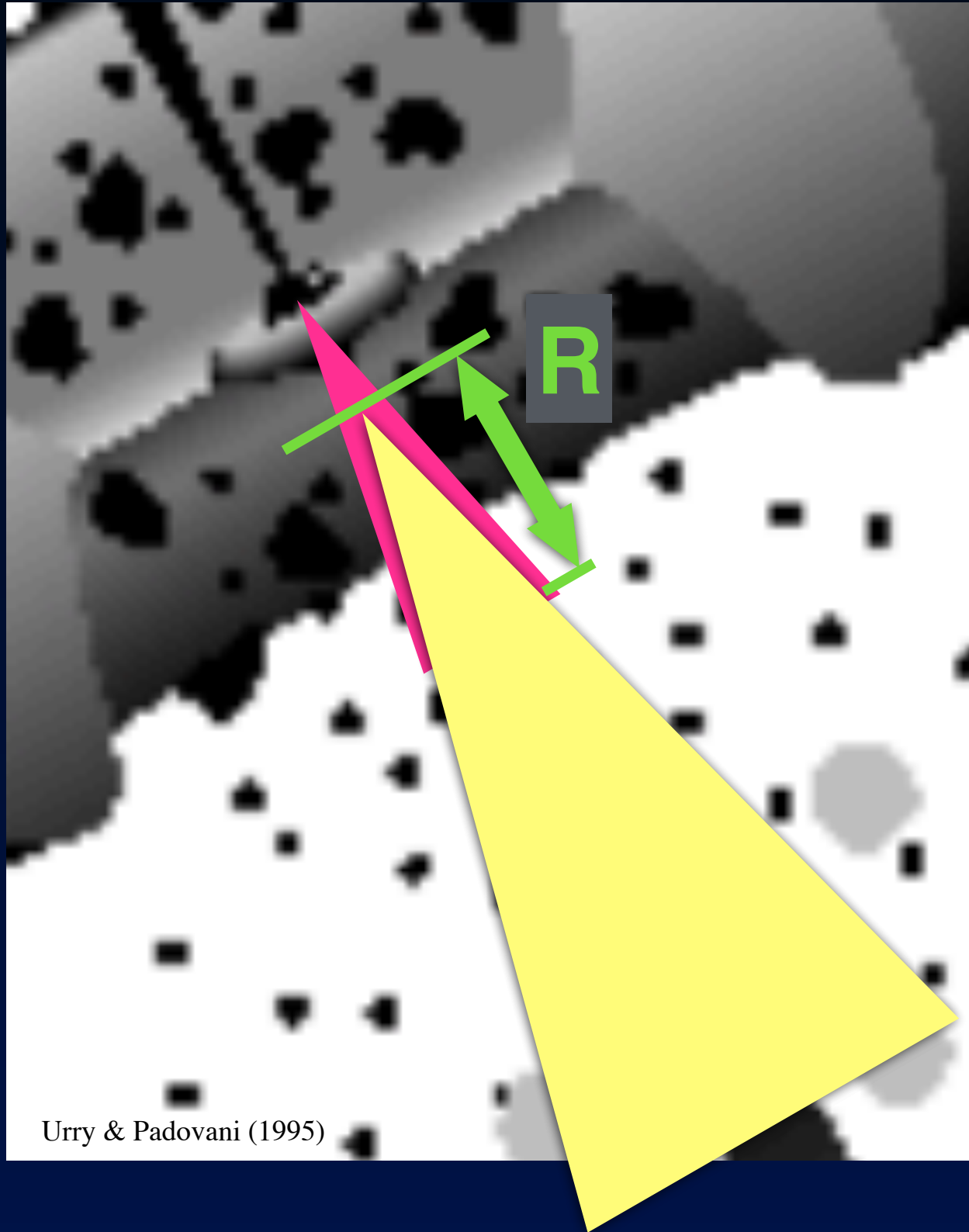


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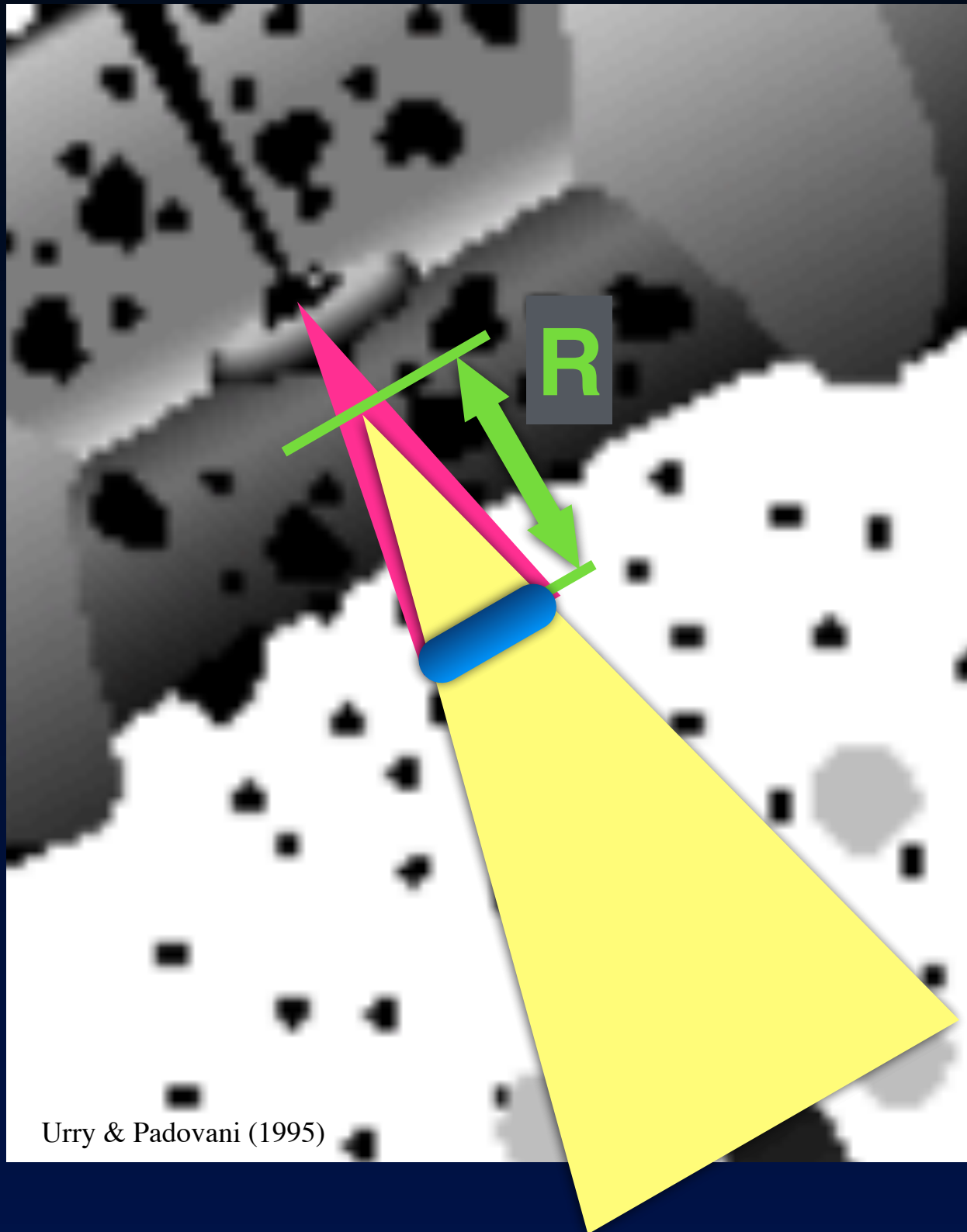
Jet Structure



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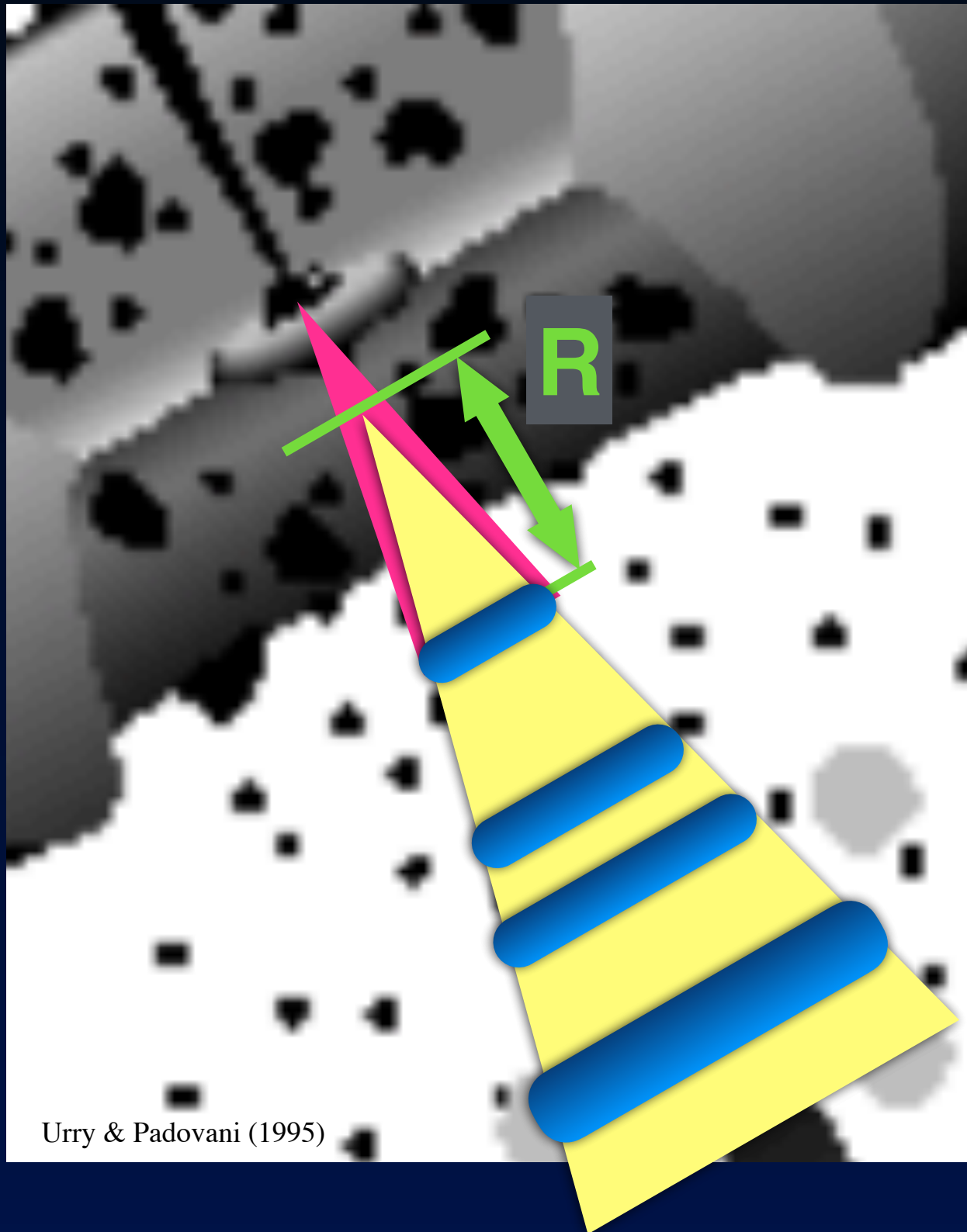
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variation of (i.e.) R
results in shock that explains flare

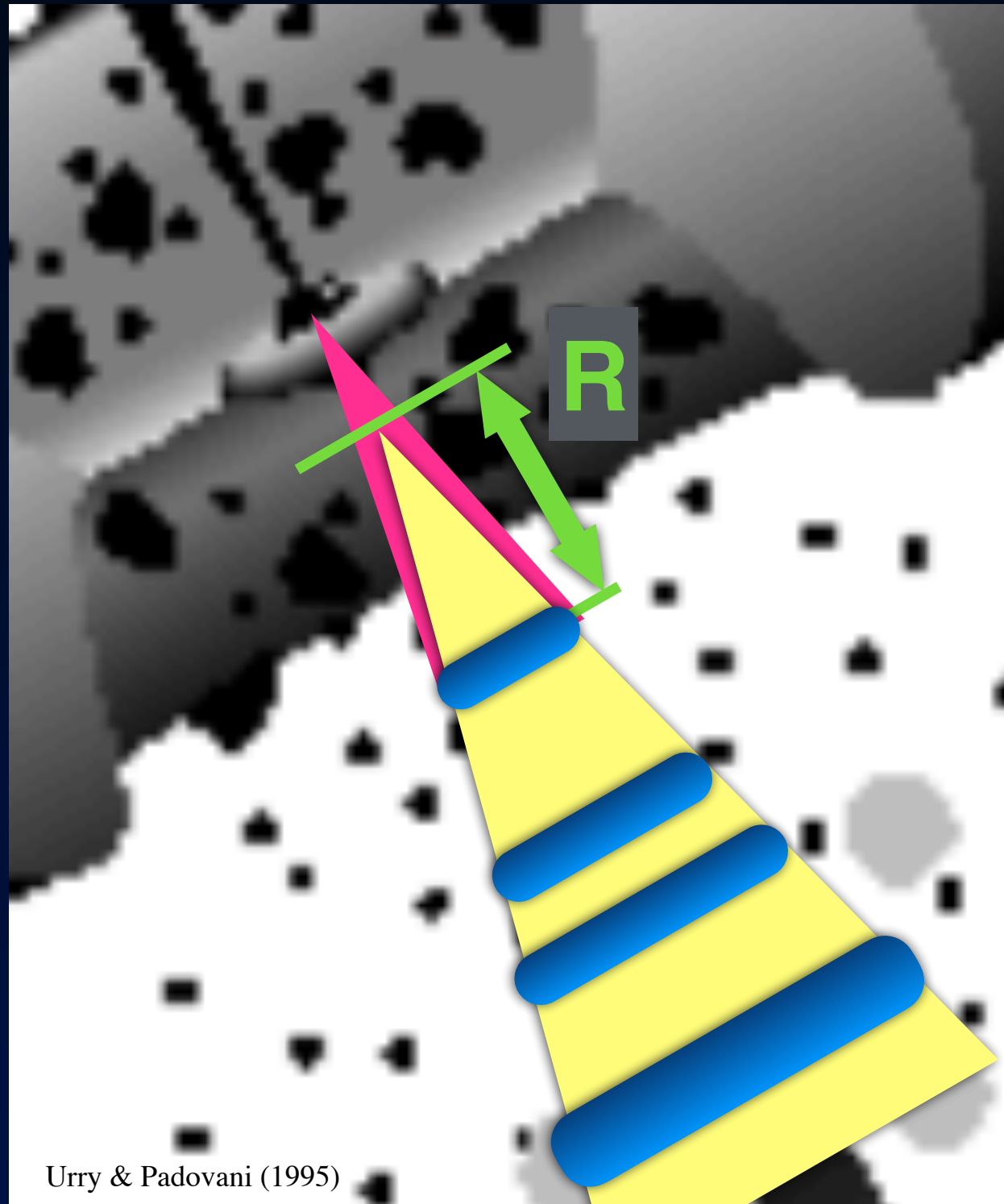
Jet Structure



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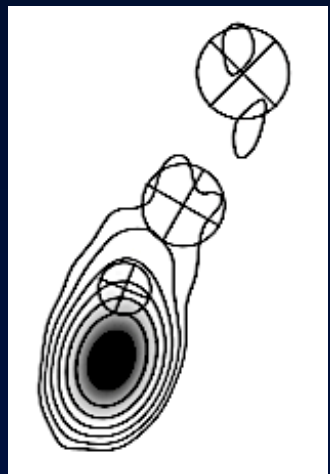
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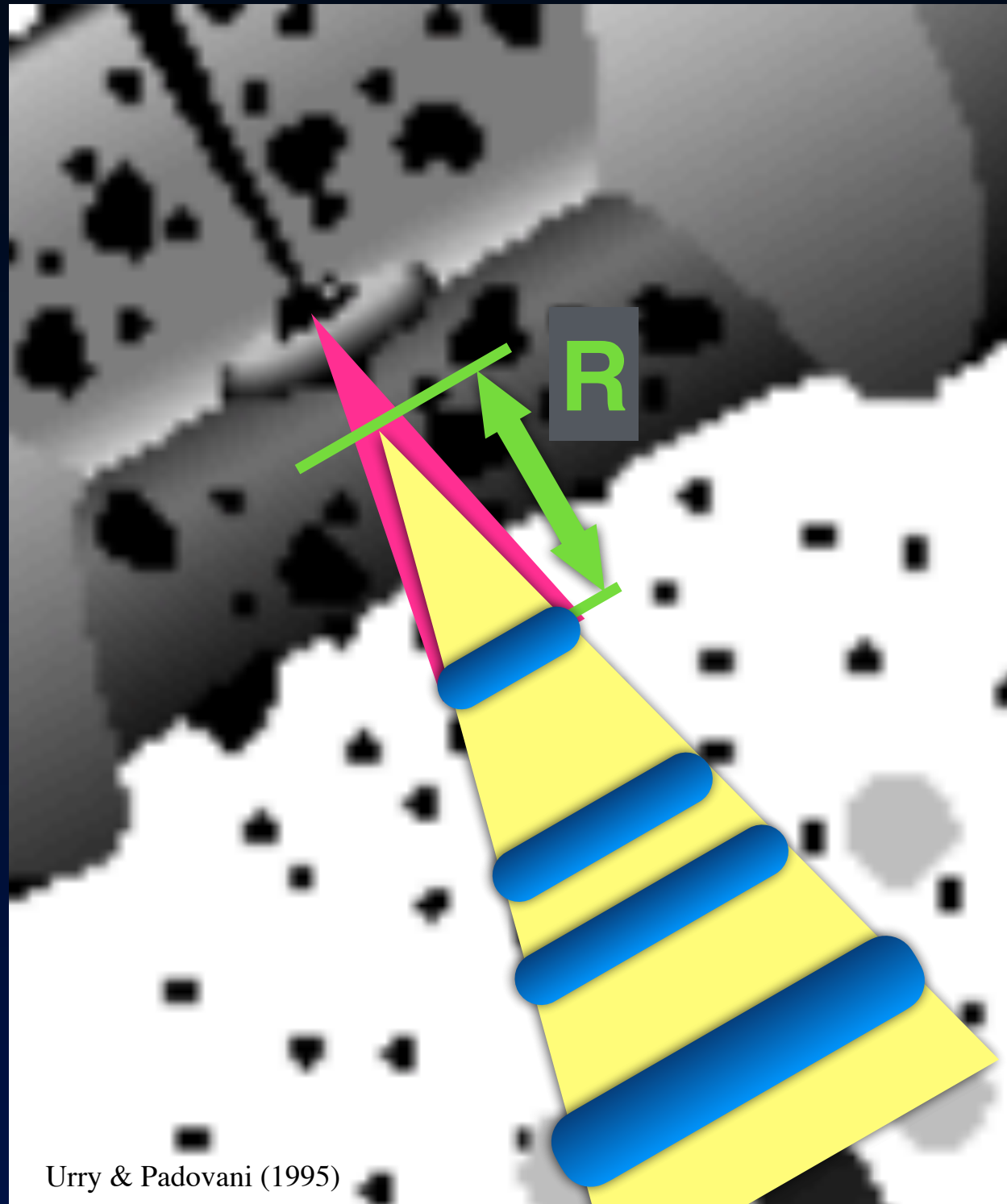


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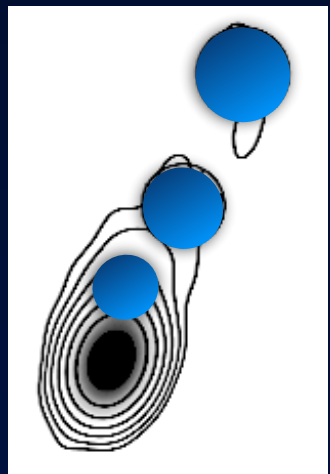


Jet Structure

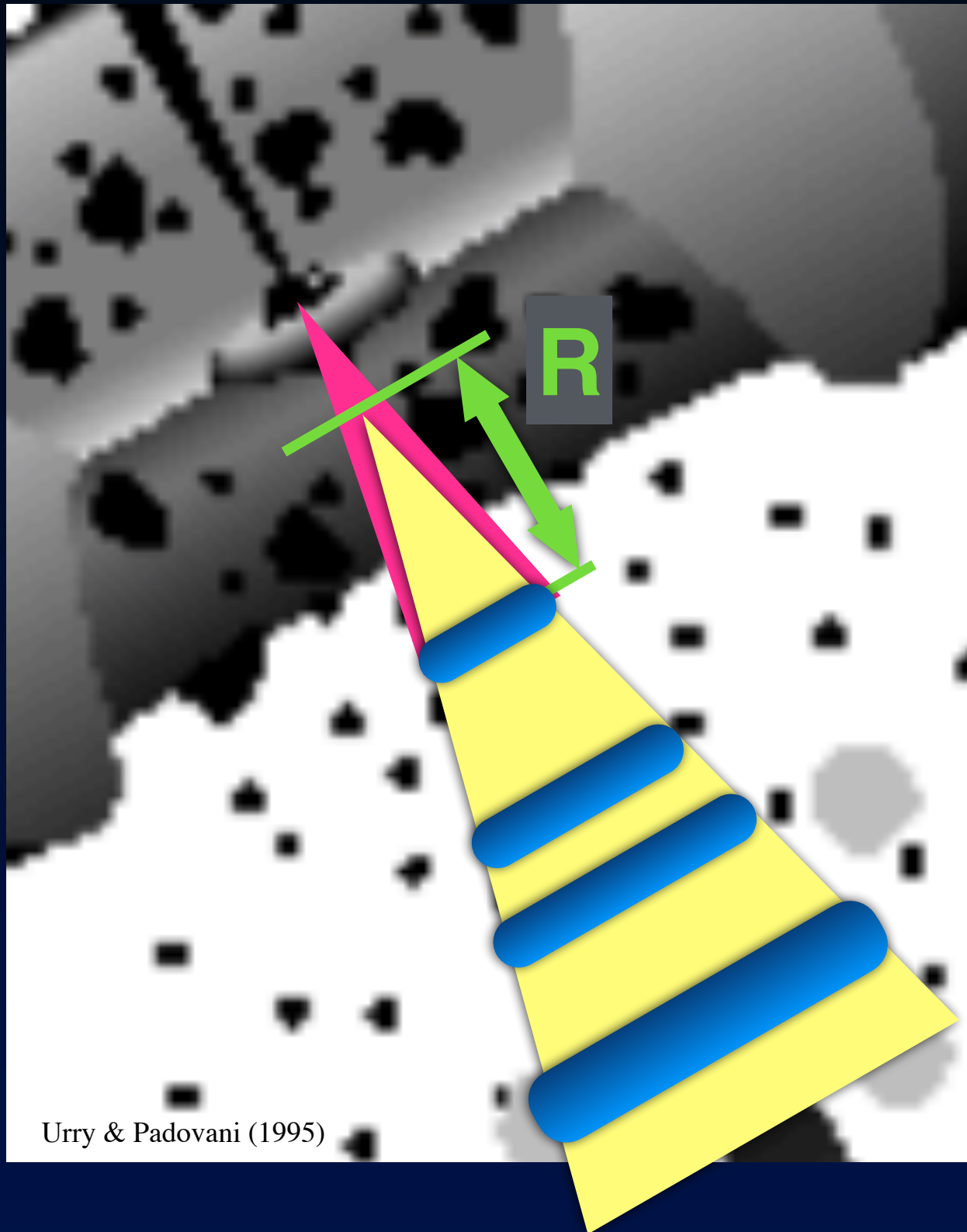


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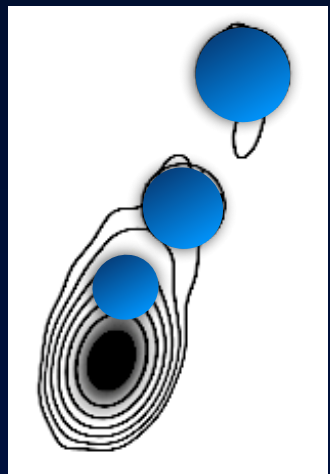


Jet Structure

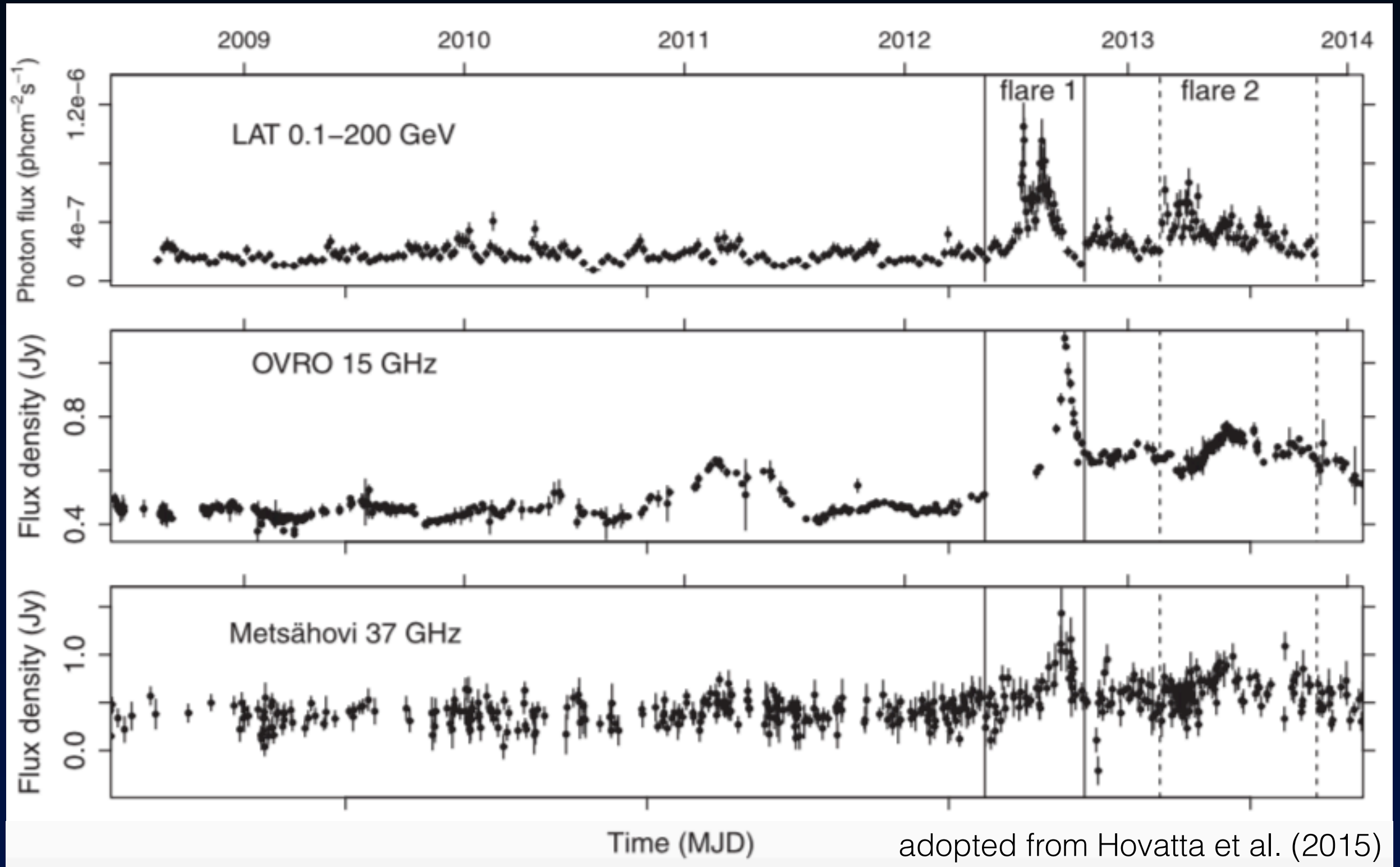


Marscher & Gear (1985):
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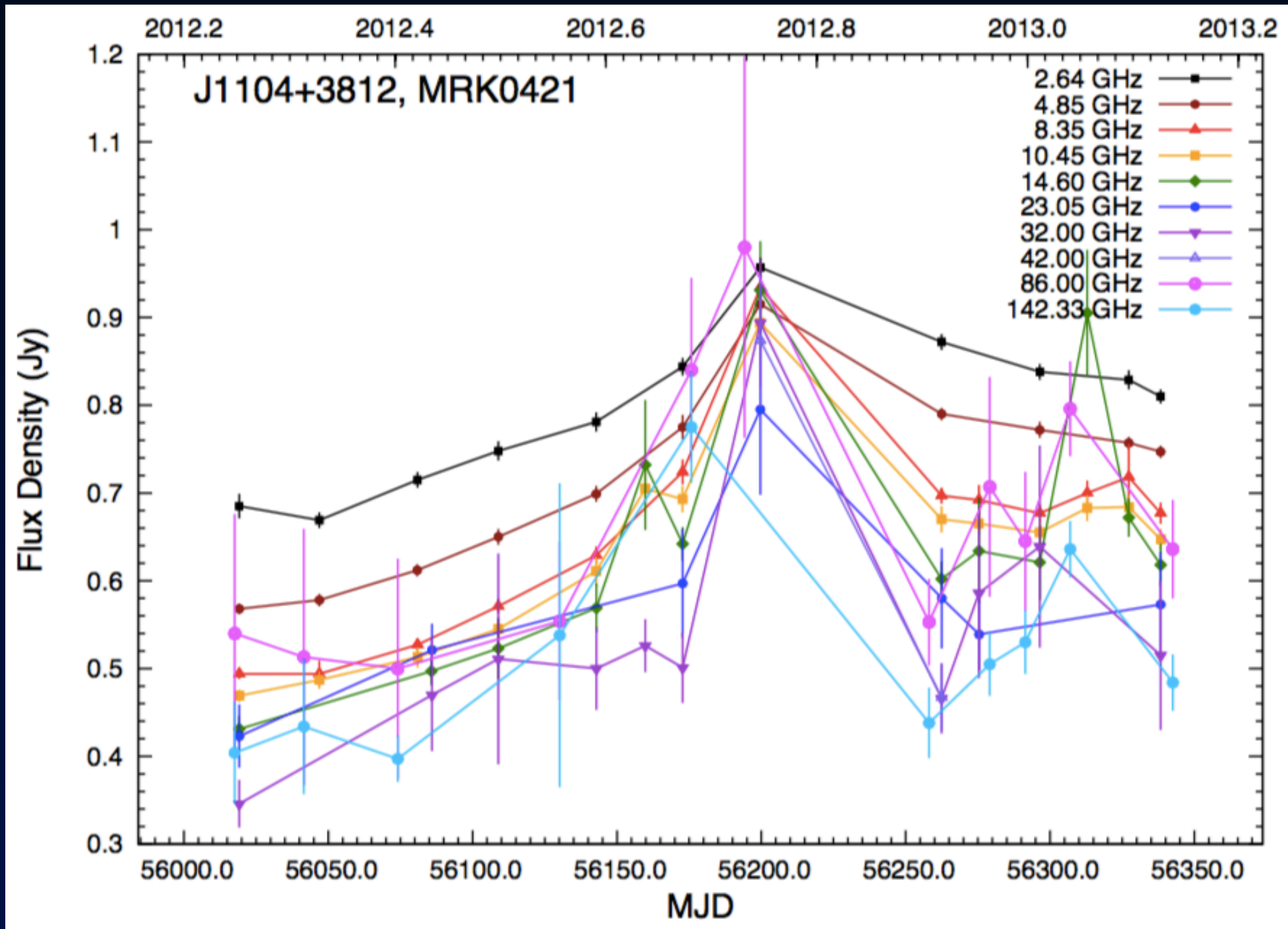
Gamma-ray and MWL Radio Flare in Mrk 421



adopted from Hovatta et al. (2015)

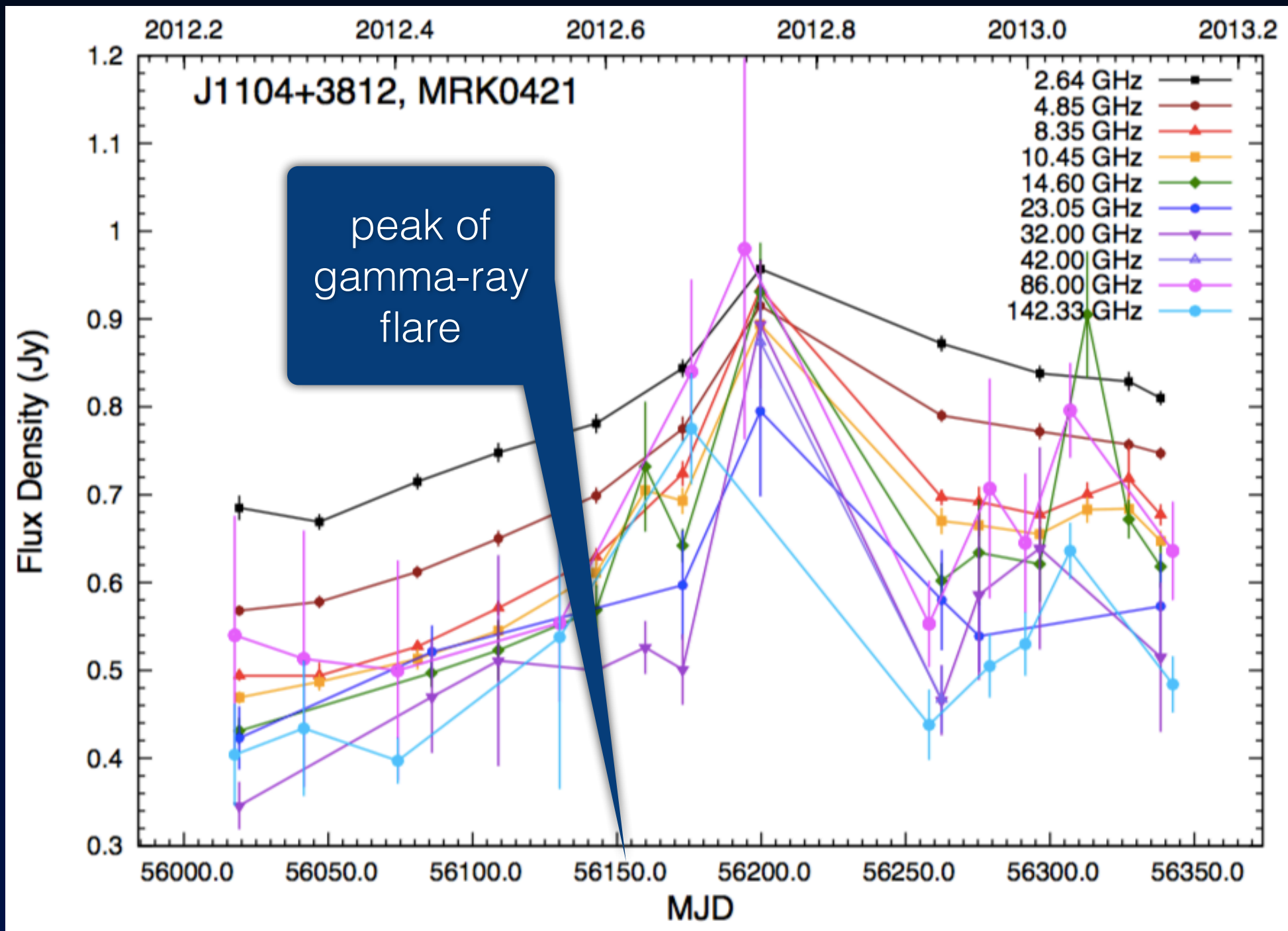
MWL Radio Flare in Mrk 421

Multiwavelength Radio Flare in Richards et al. (2013)



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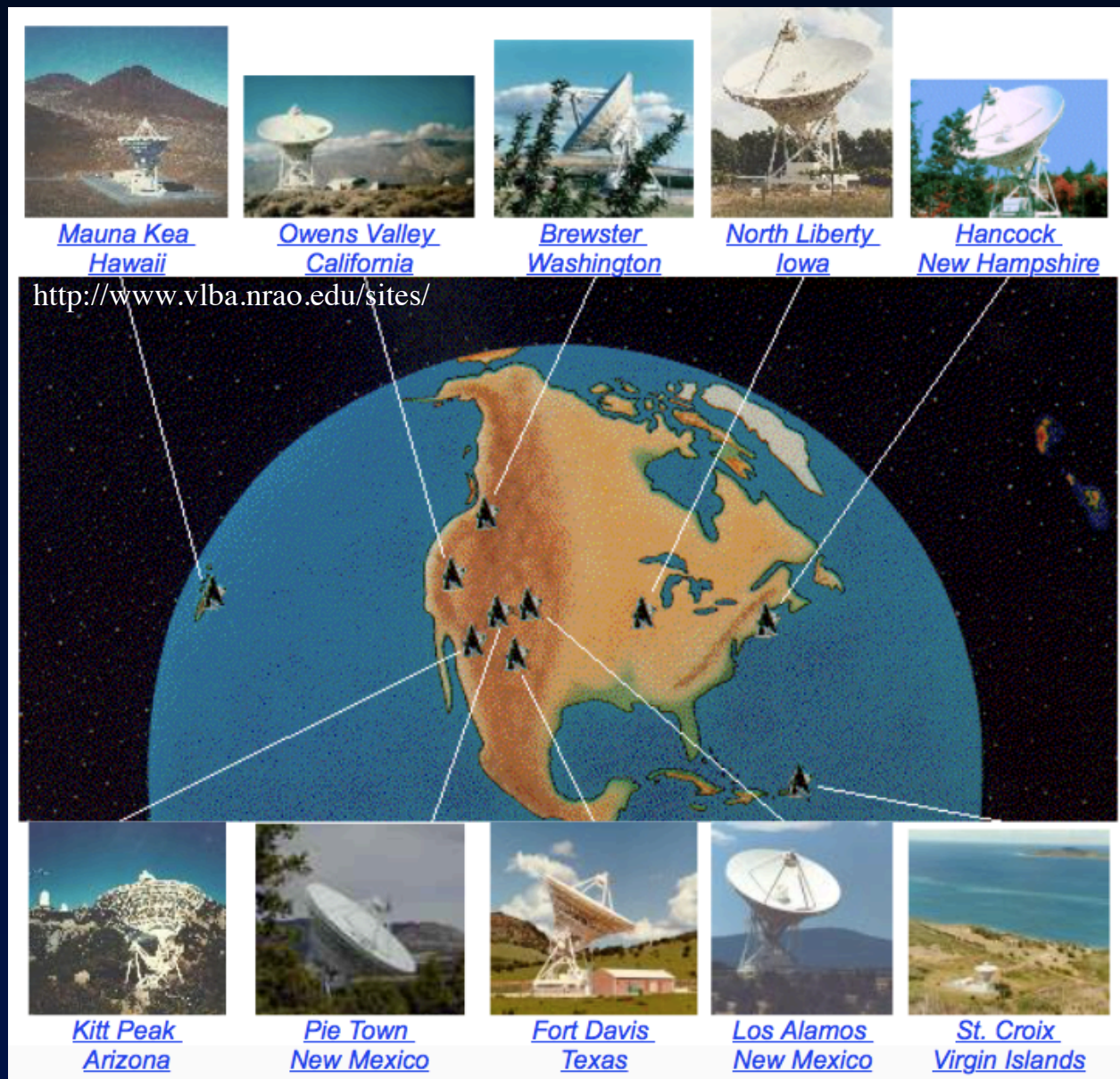
Multiwavelength Radio Flare in Richards et al. (2013)



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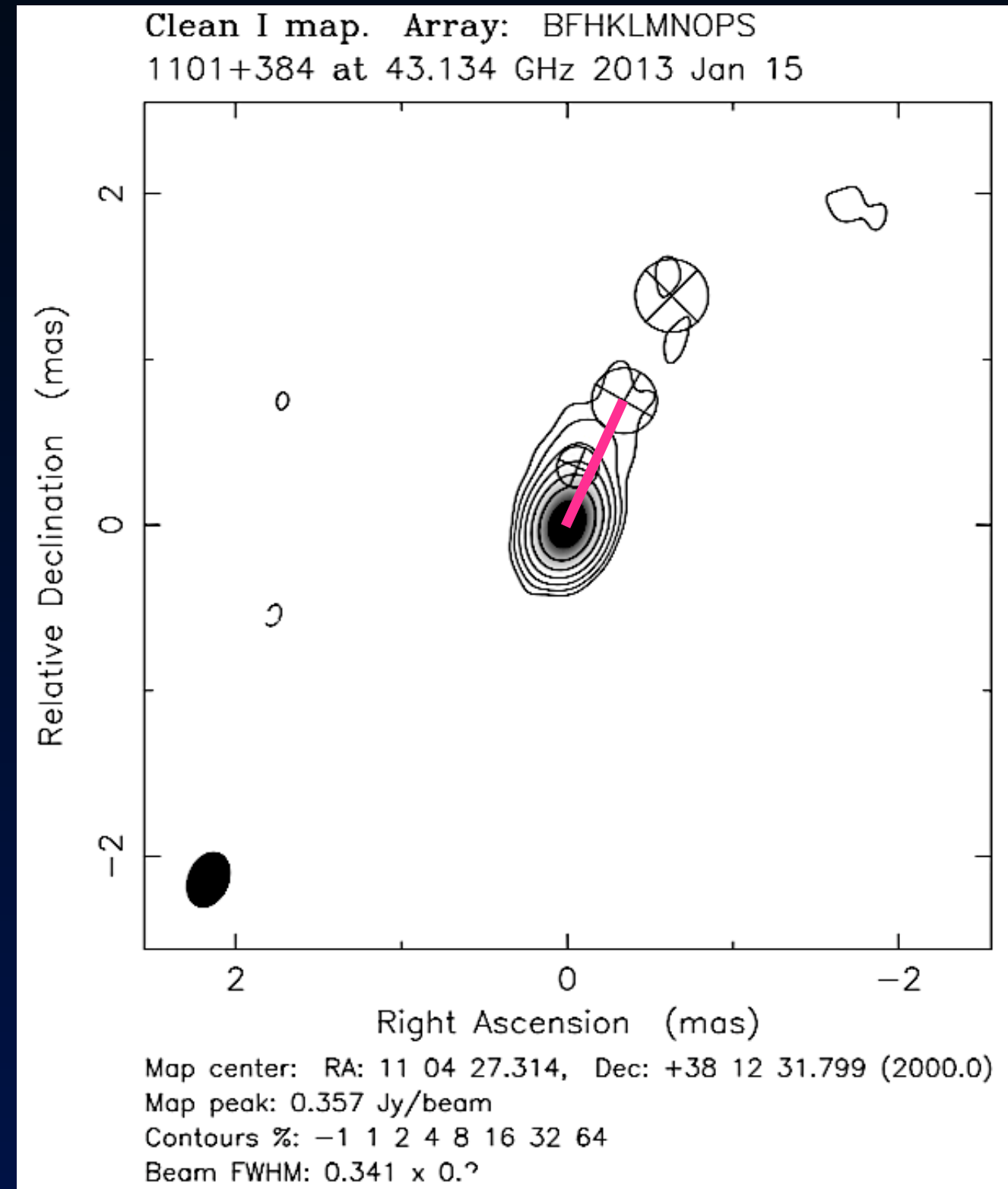
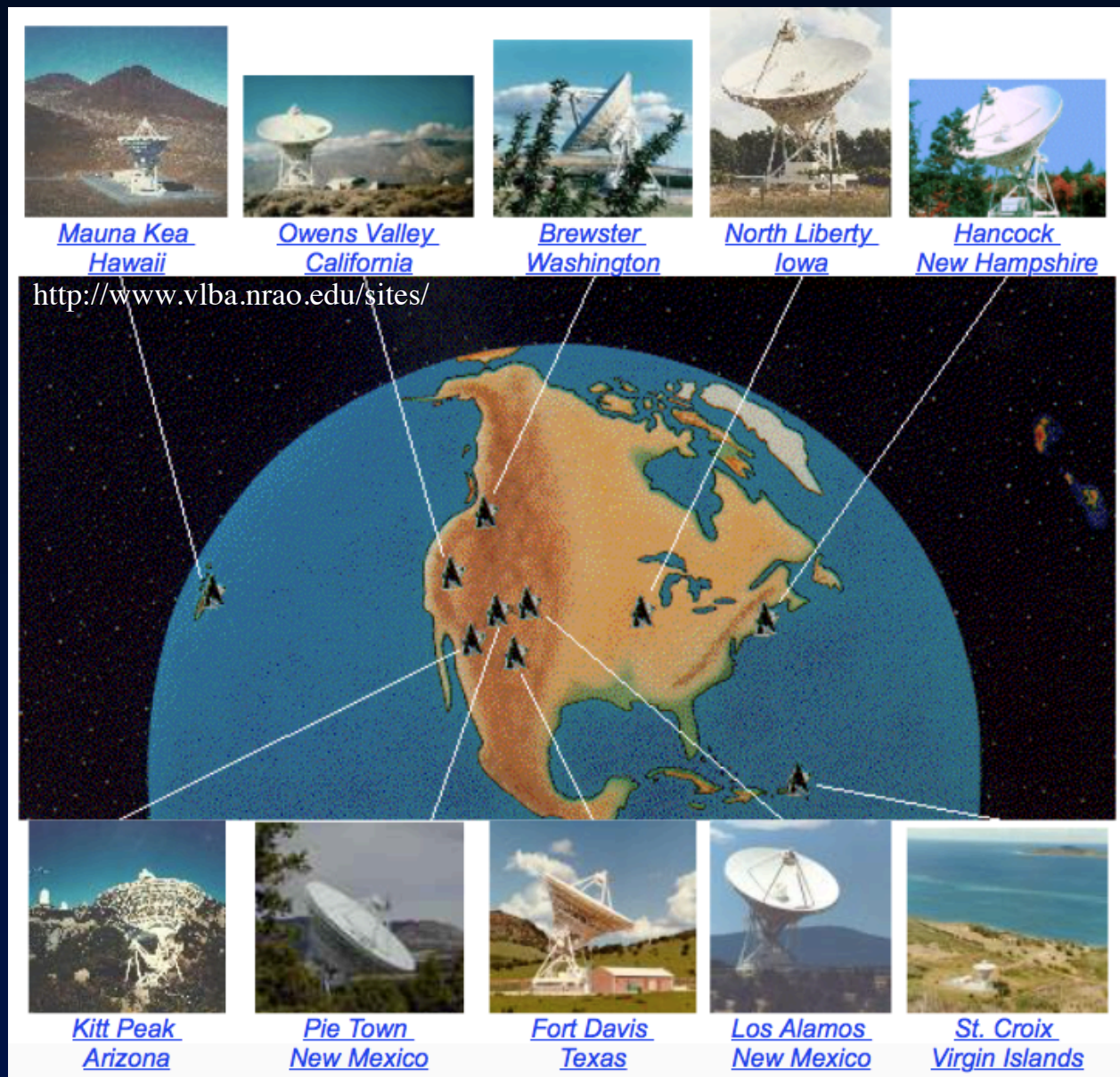
VLBI Observations

Boston University Blazar
Monitoring Program (BU)
using VLBA

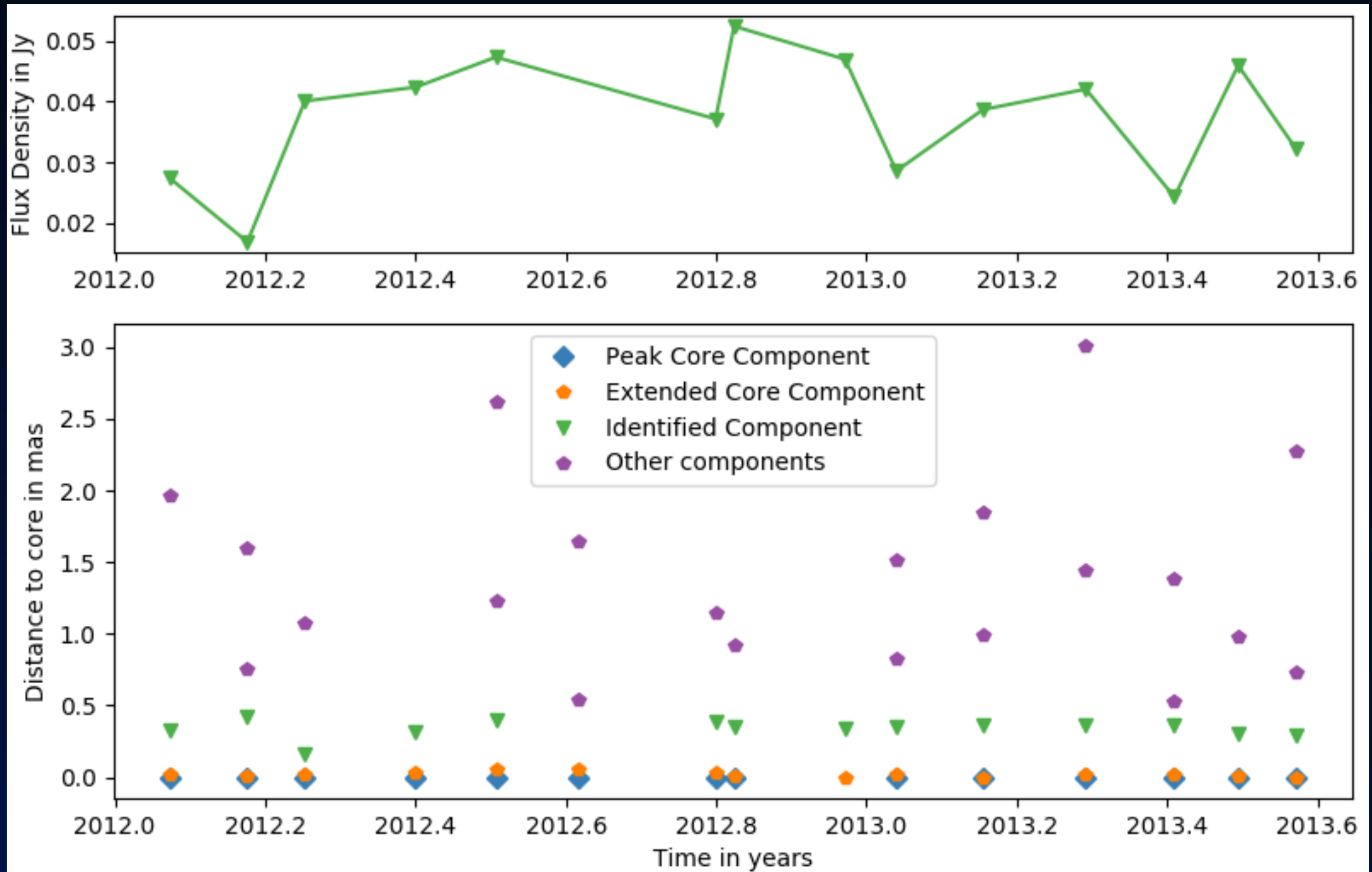


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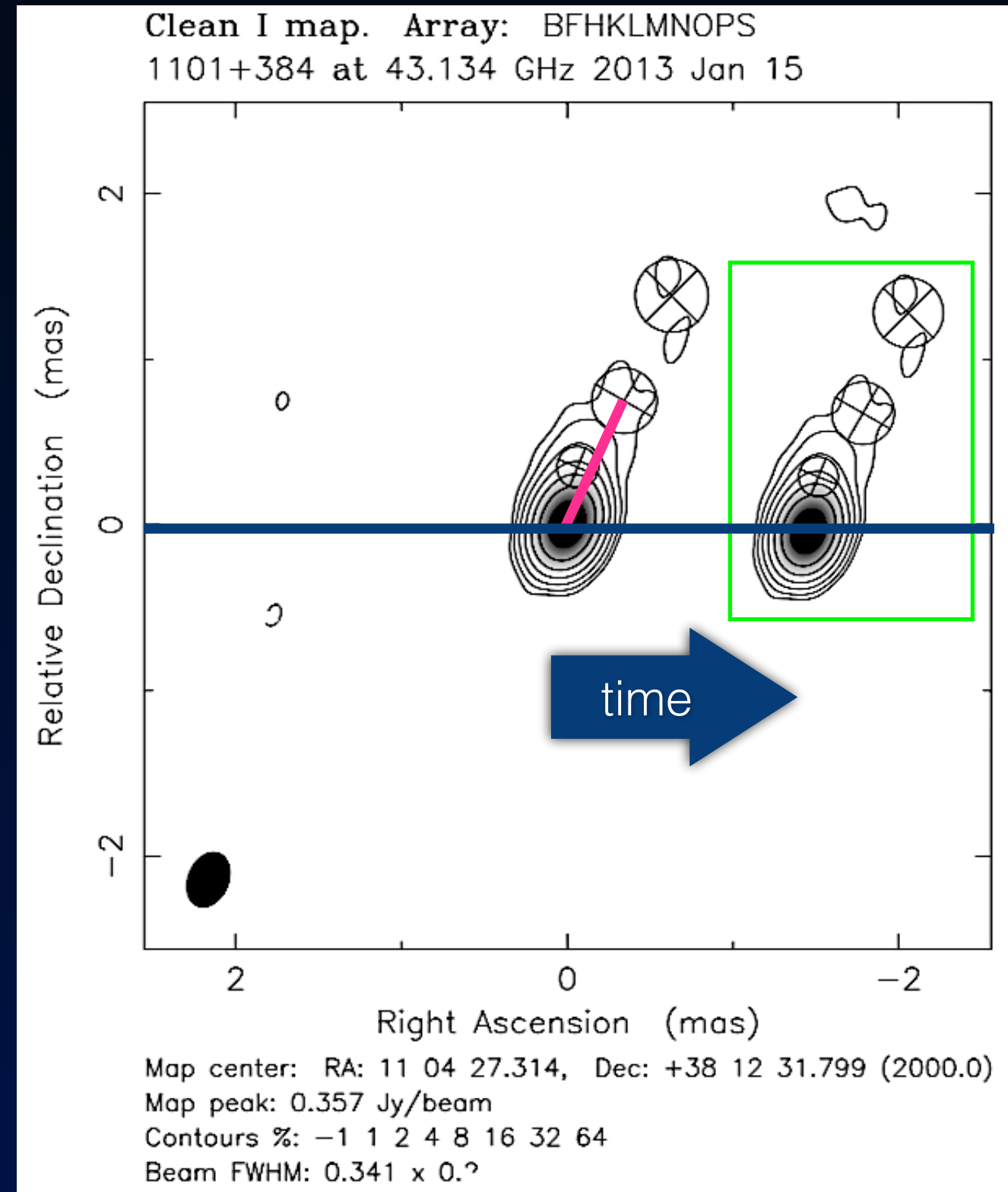
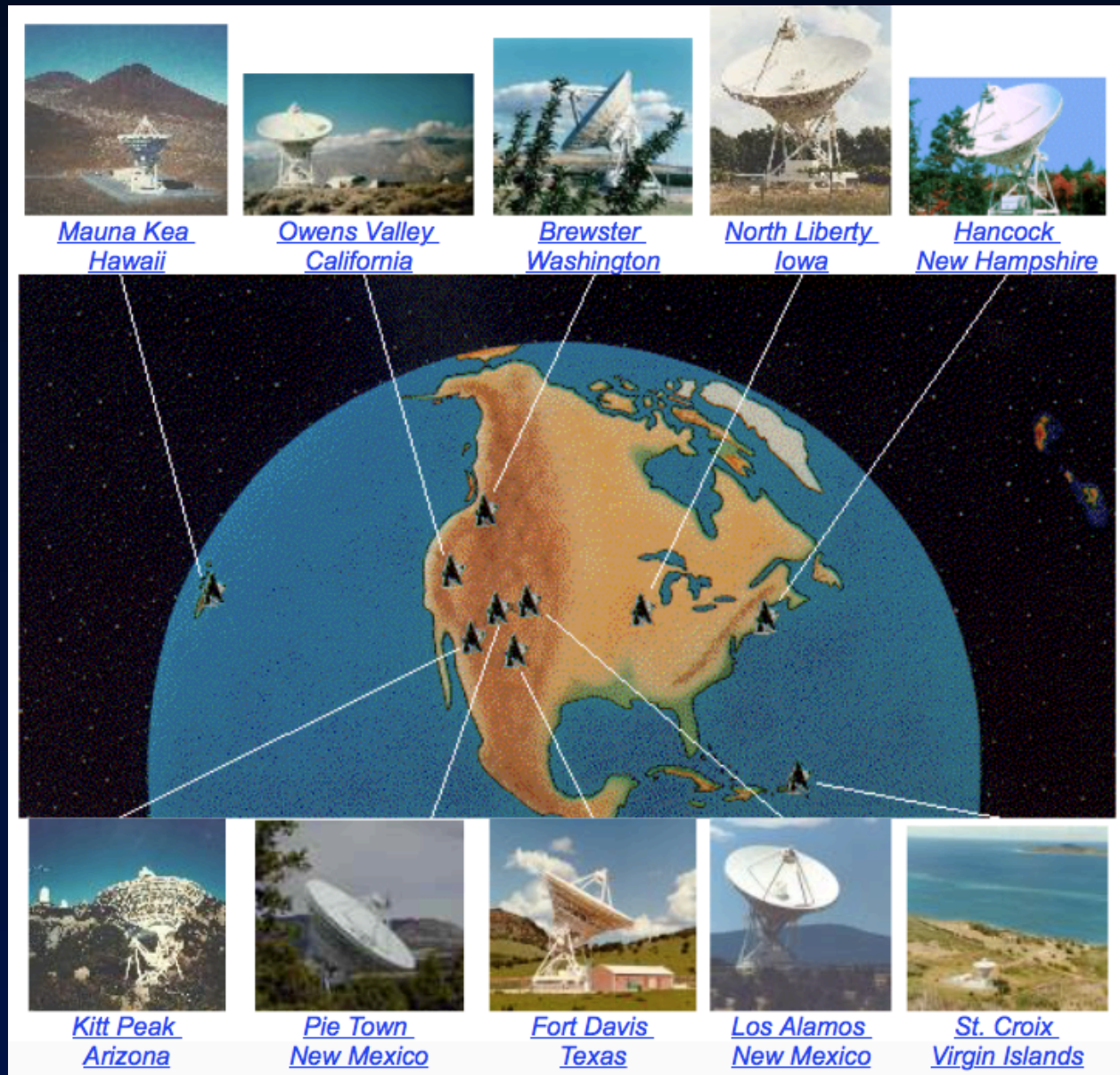


Results: Component Evolution in Mrk 421 at 43 GHz

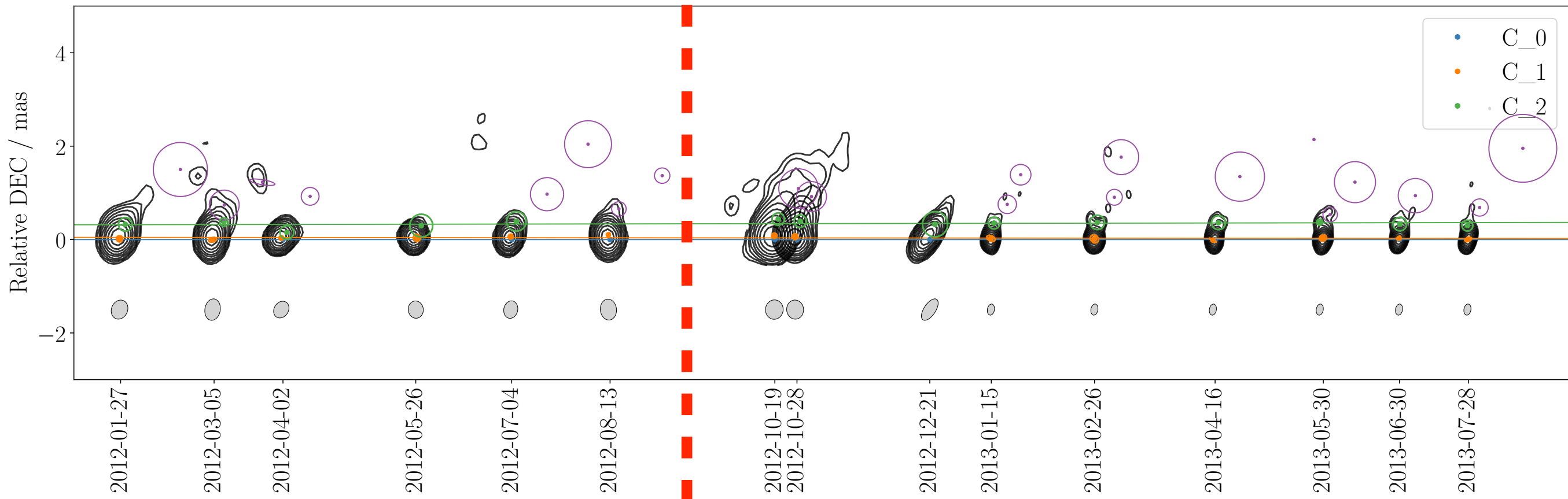


VLBI Observations

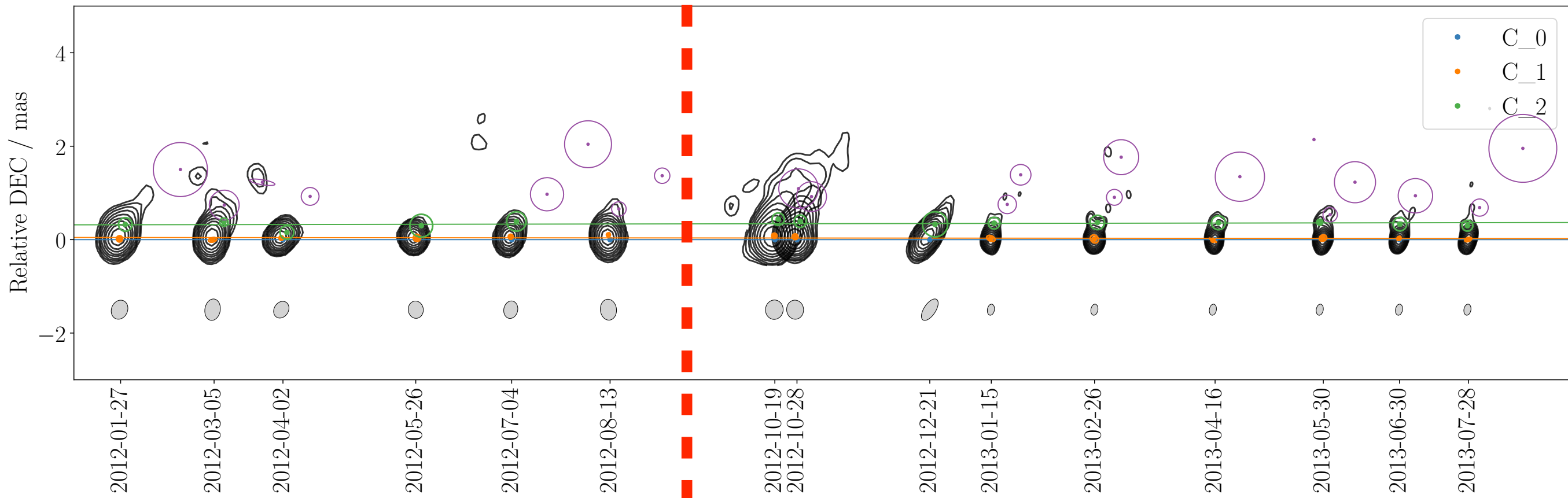
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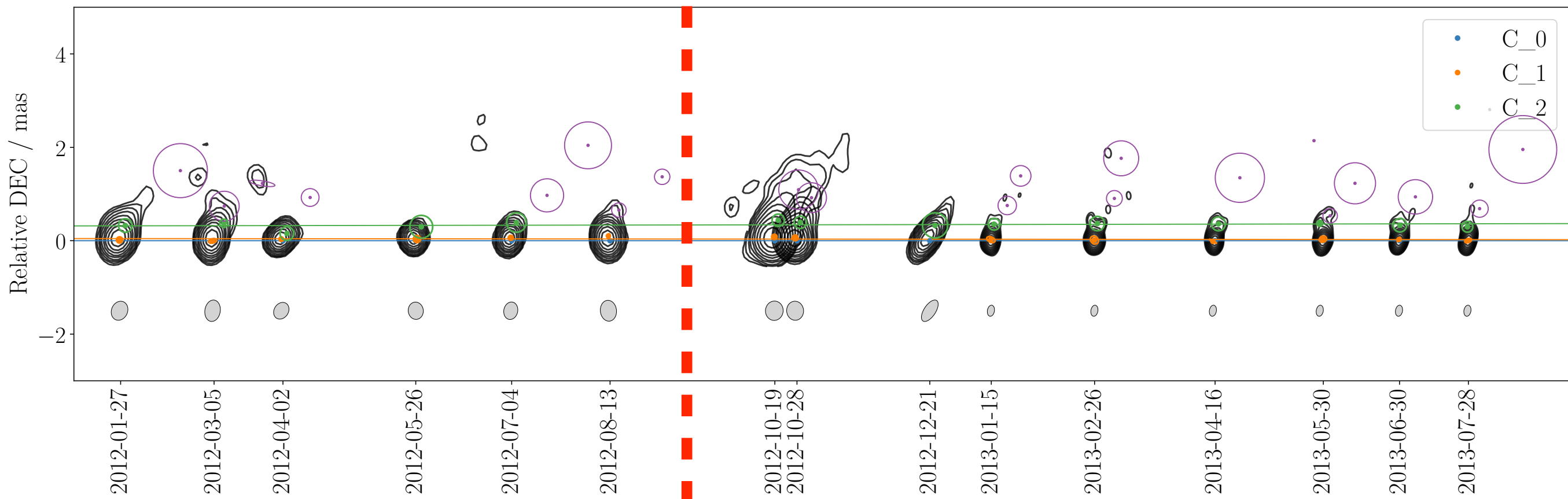


Results: Jet Structural Evolution of Mrk 421 at 43 GHz



- ➔ identification is complicated
- ➔ complex structure

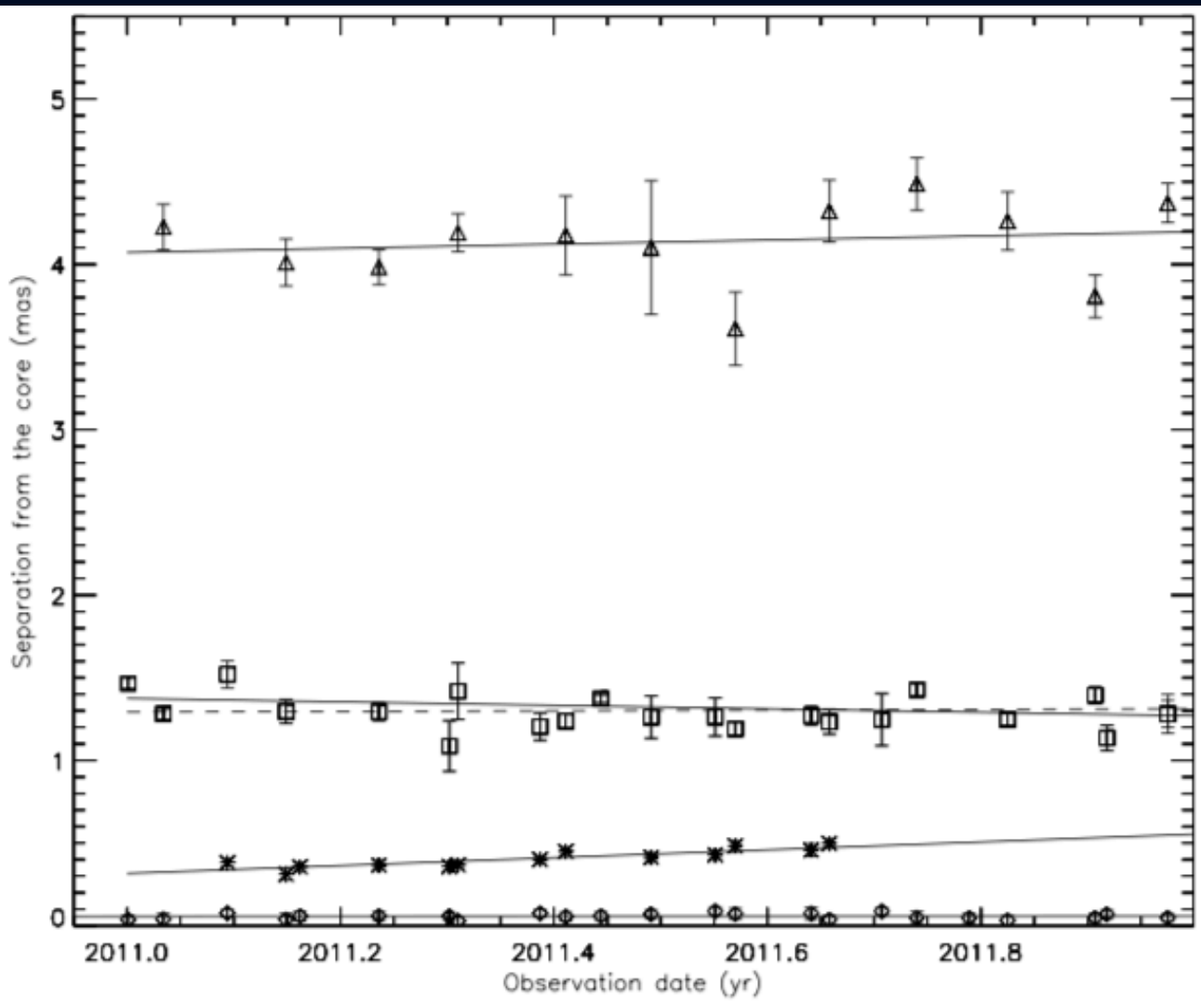
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Comparison to previous studies of Mrk421

Component evolution in Blasi et al. (2013) at 43 GHz
identified components



Conclusions

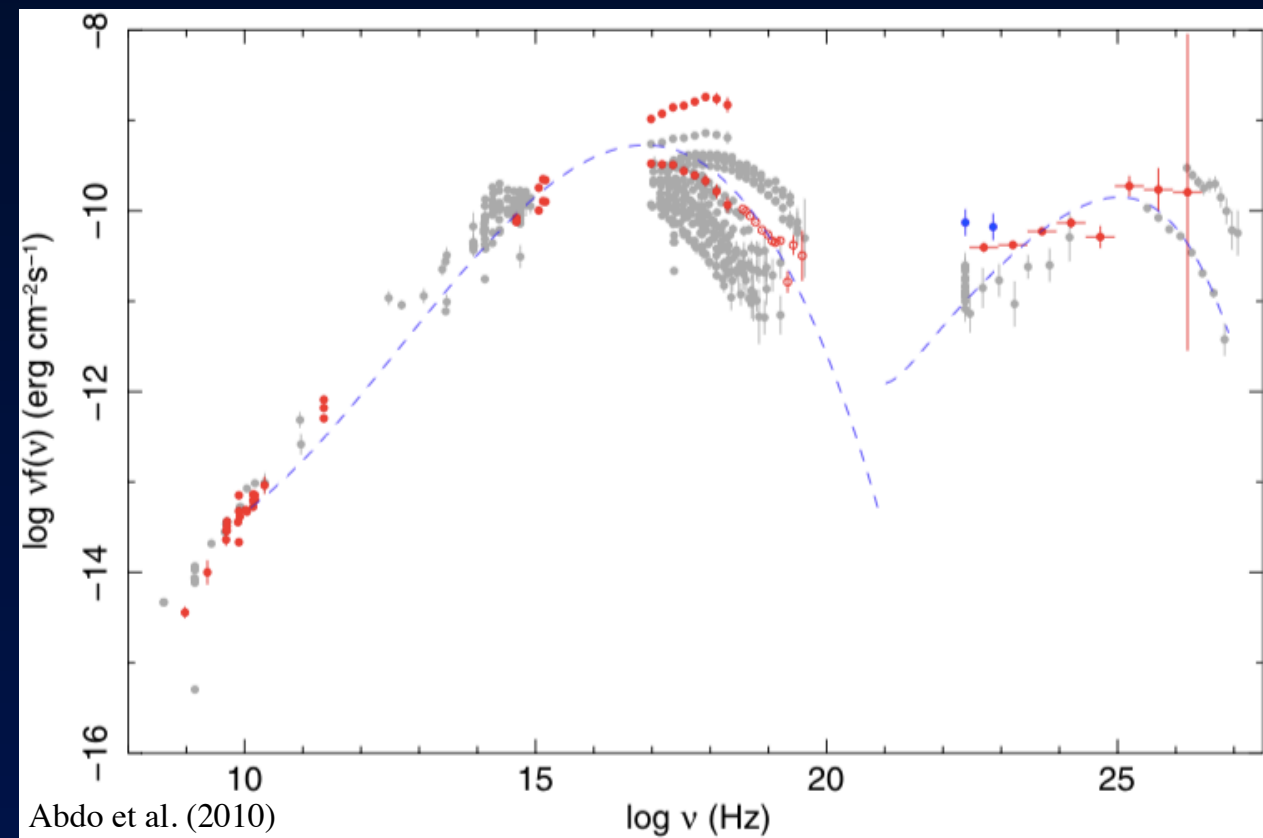
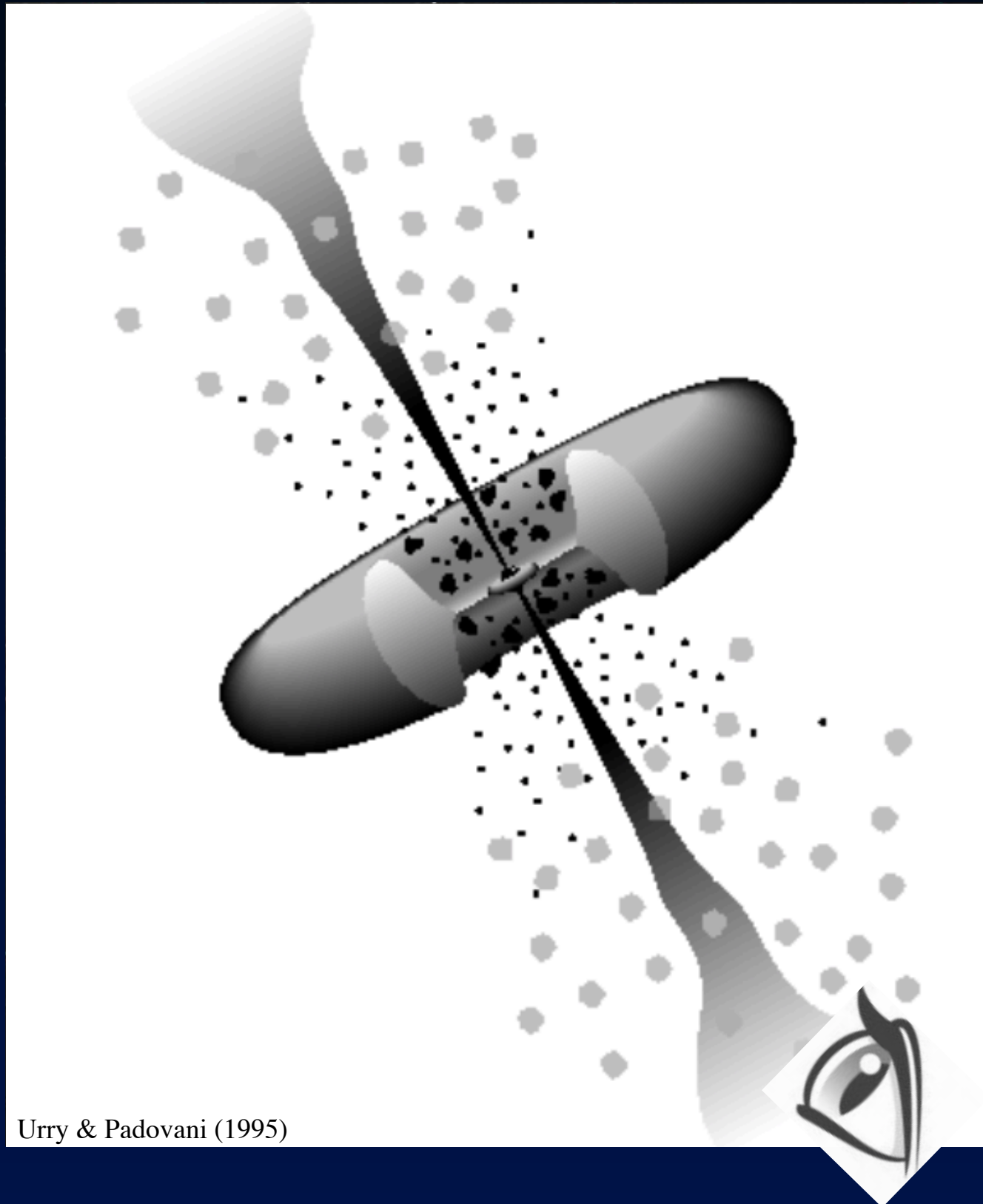
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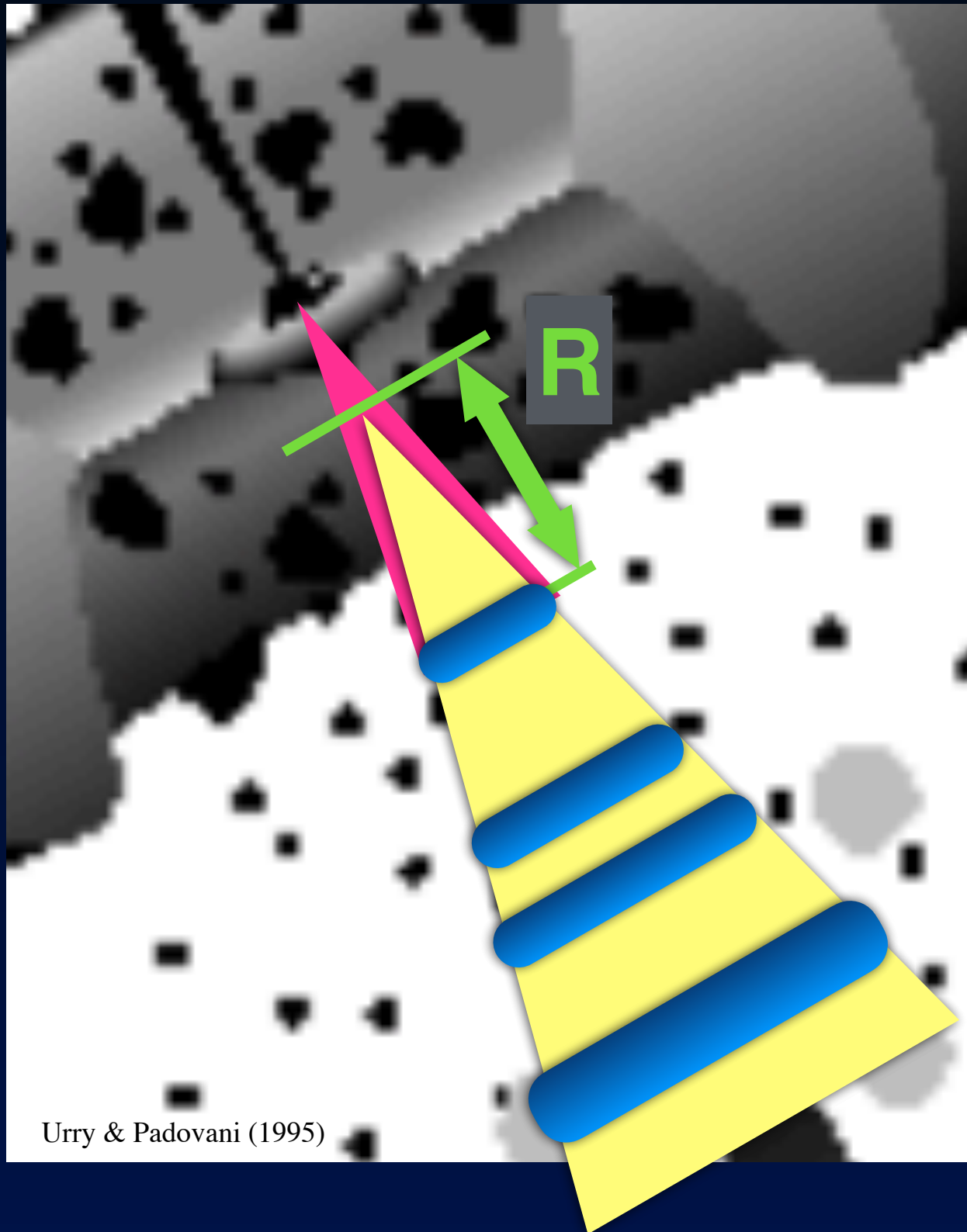
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Thank you for your attention!

Active Galactic Nuclei and Blazars

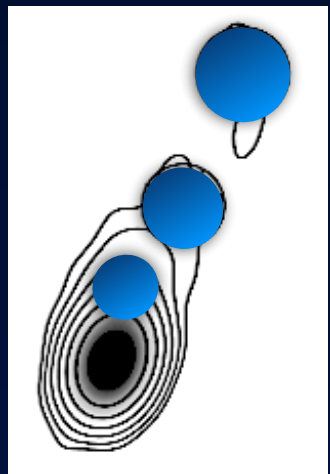


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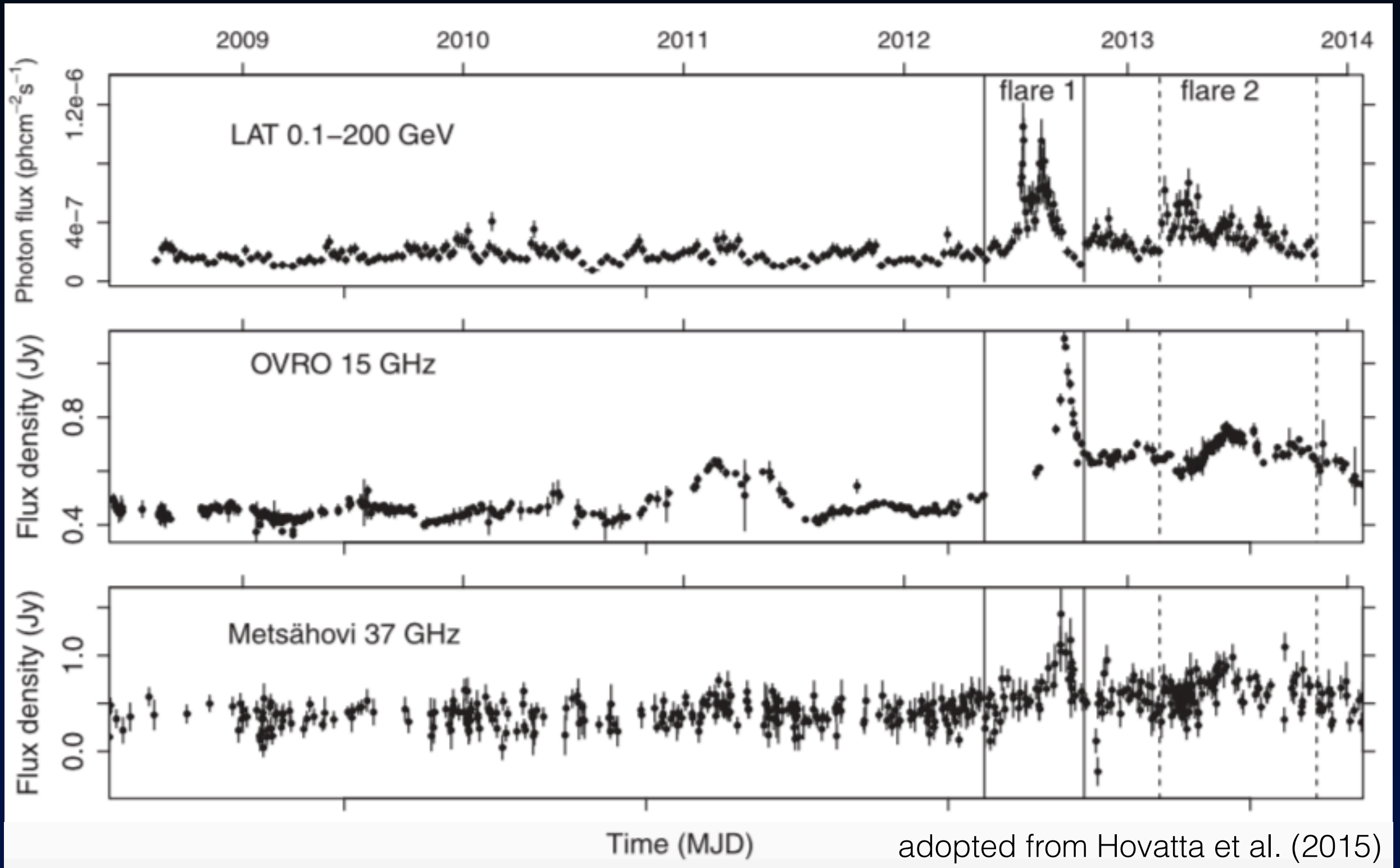


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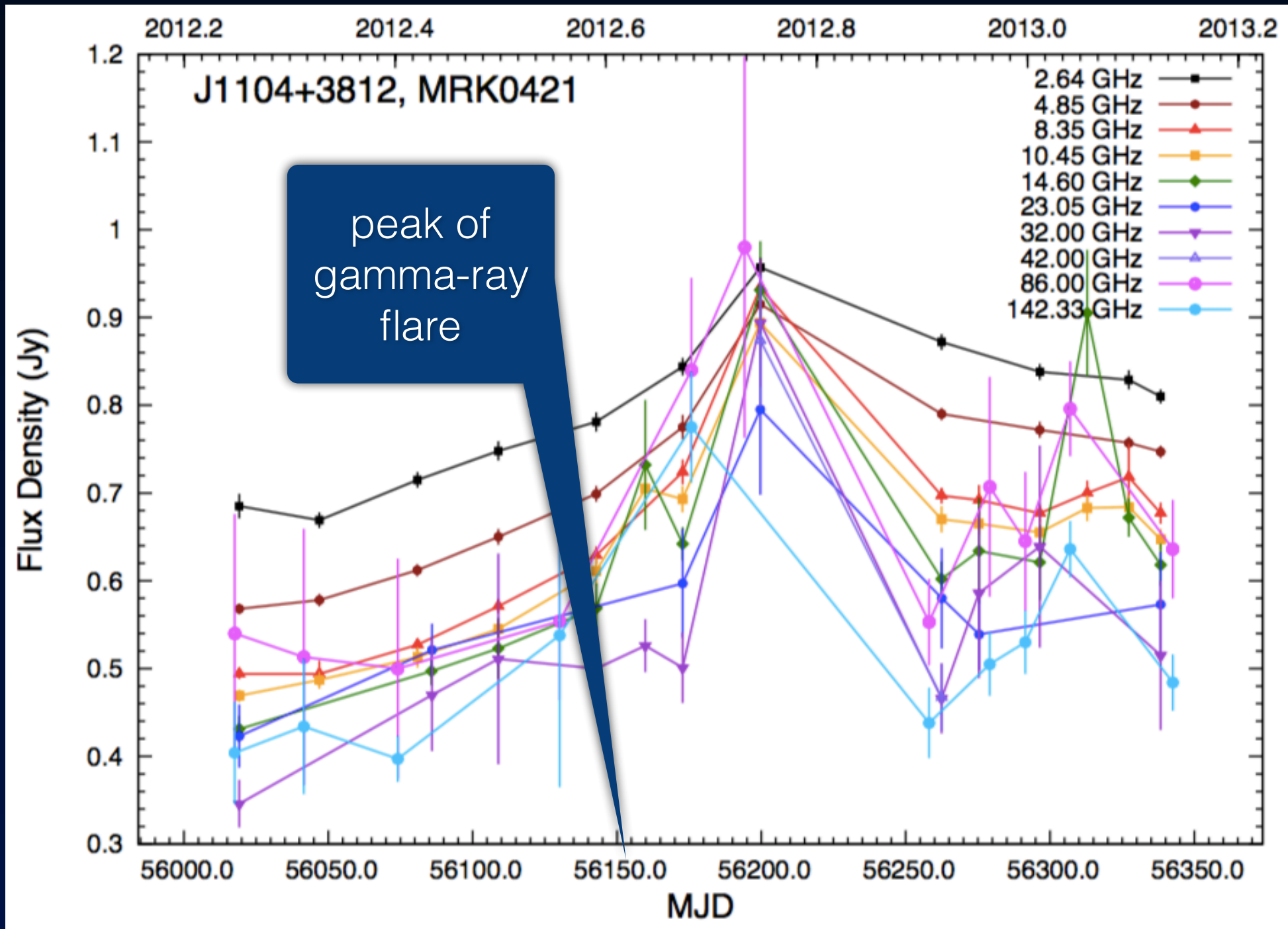
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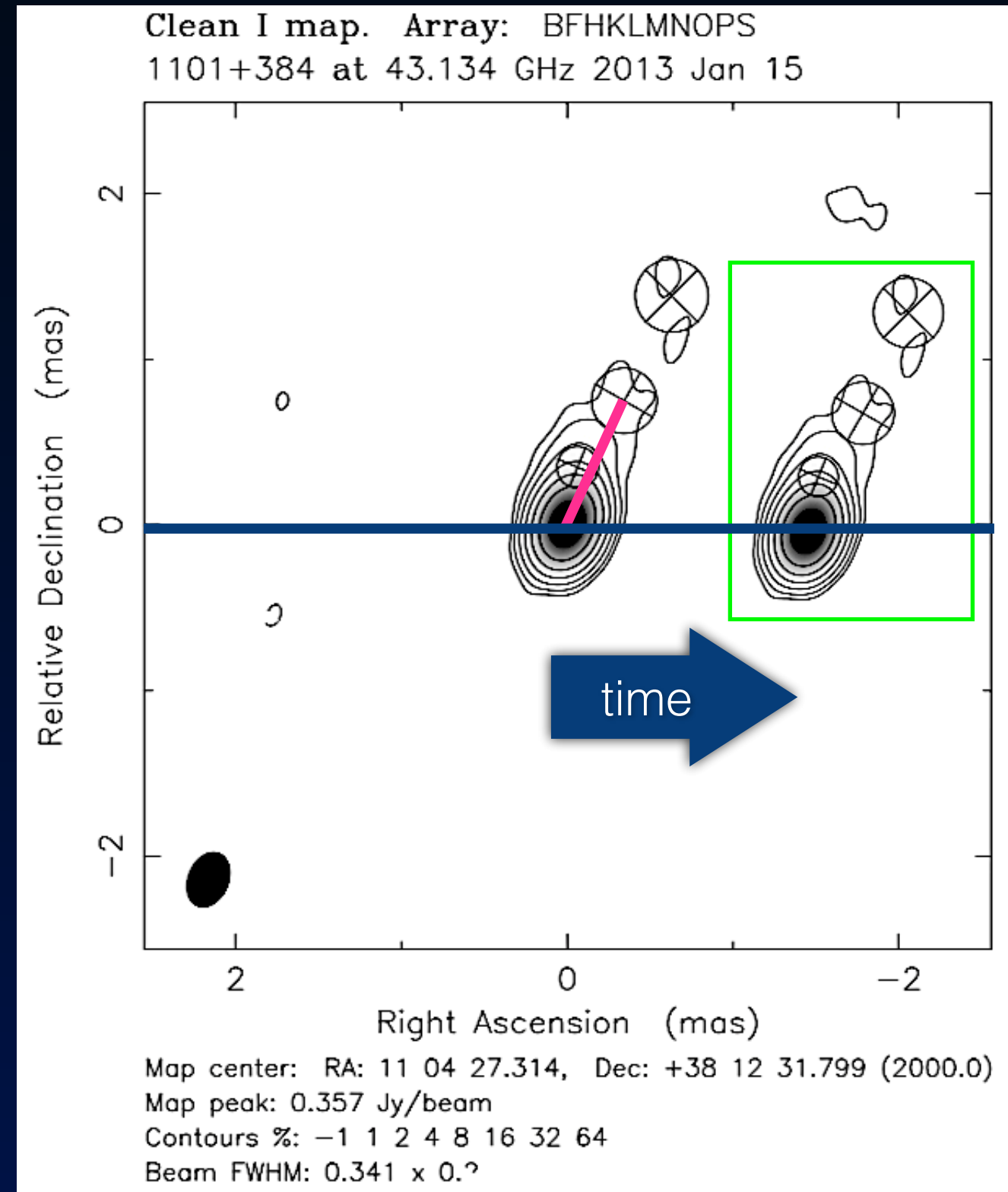
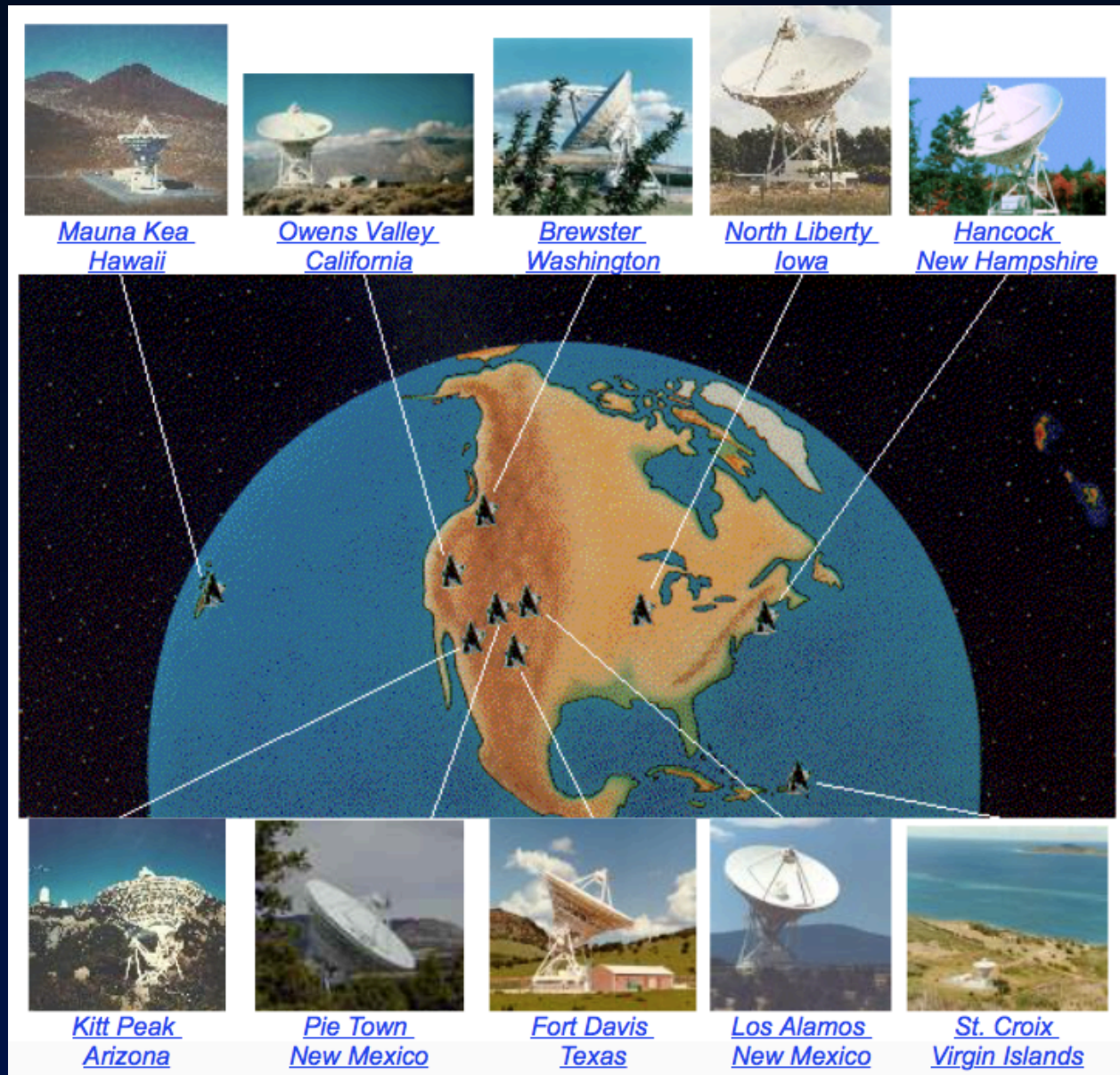
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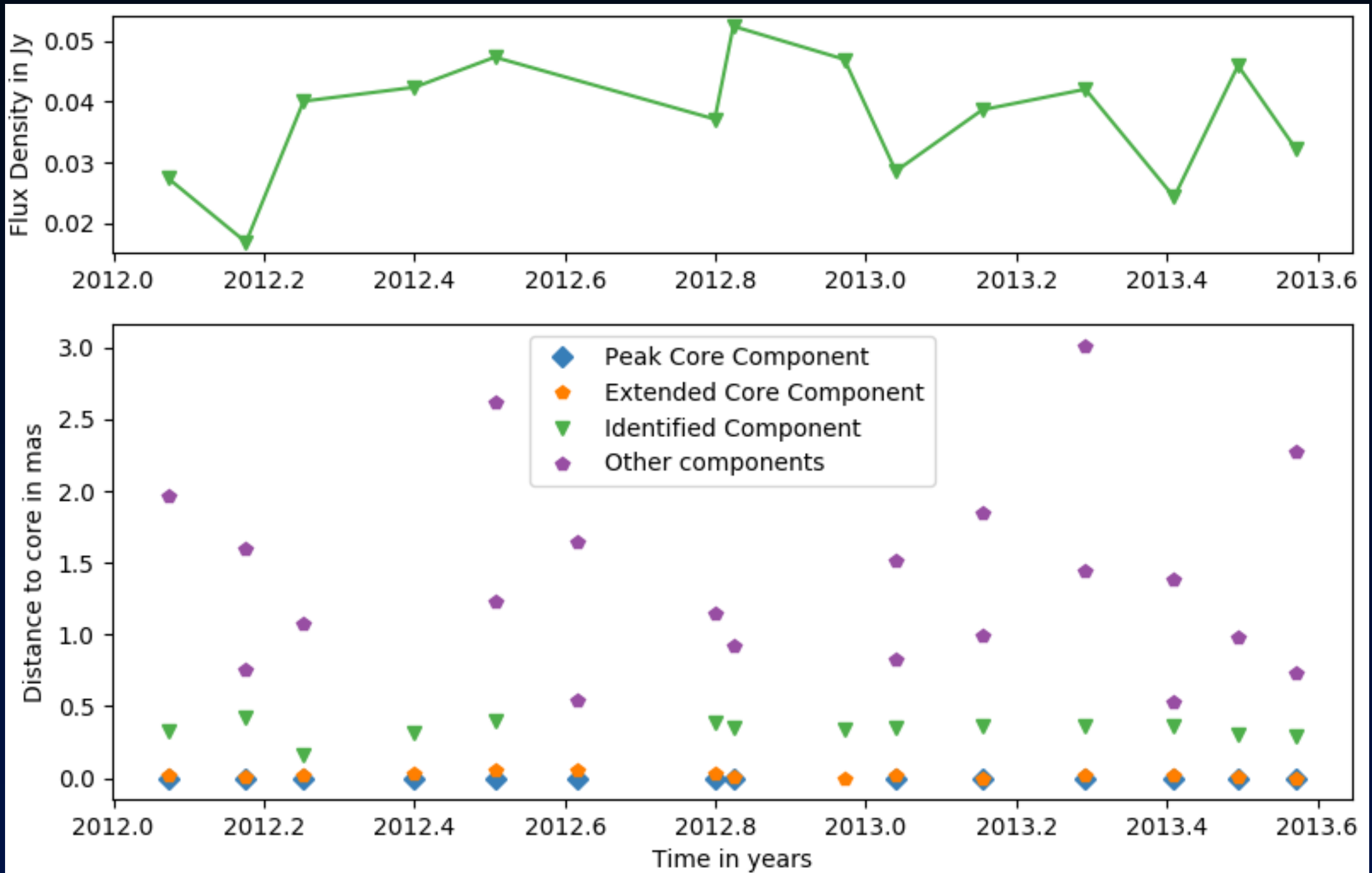
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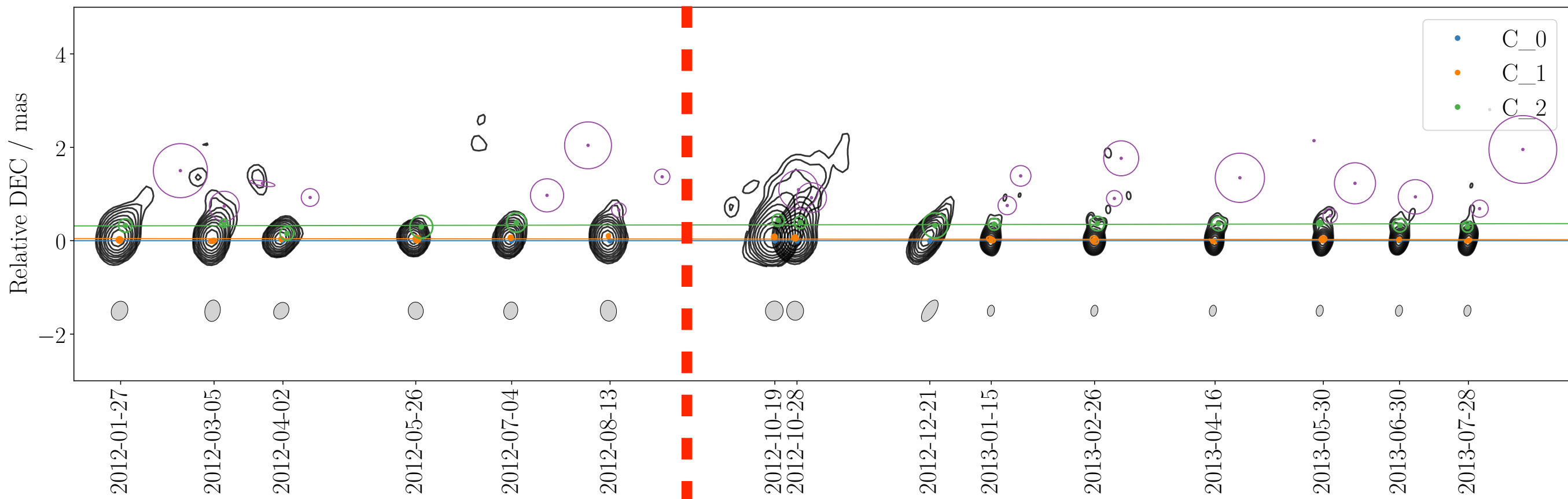
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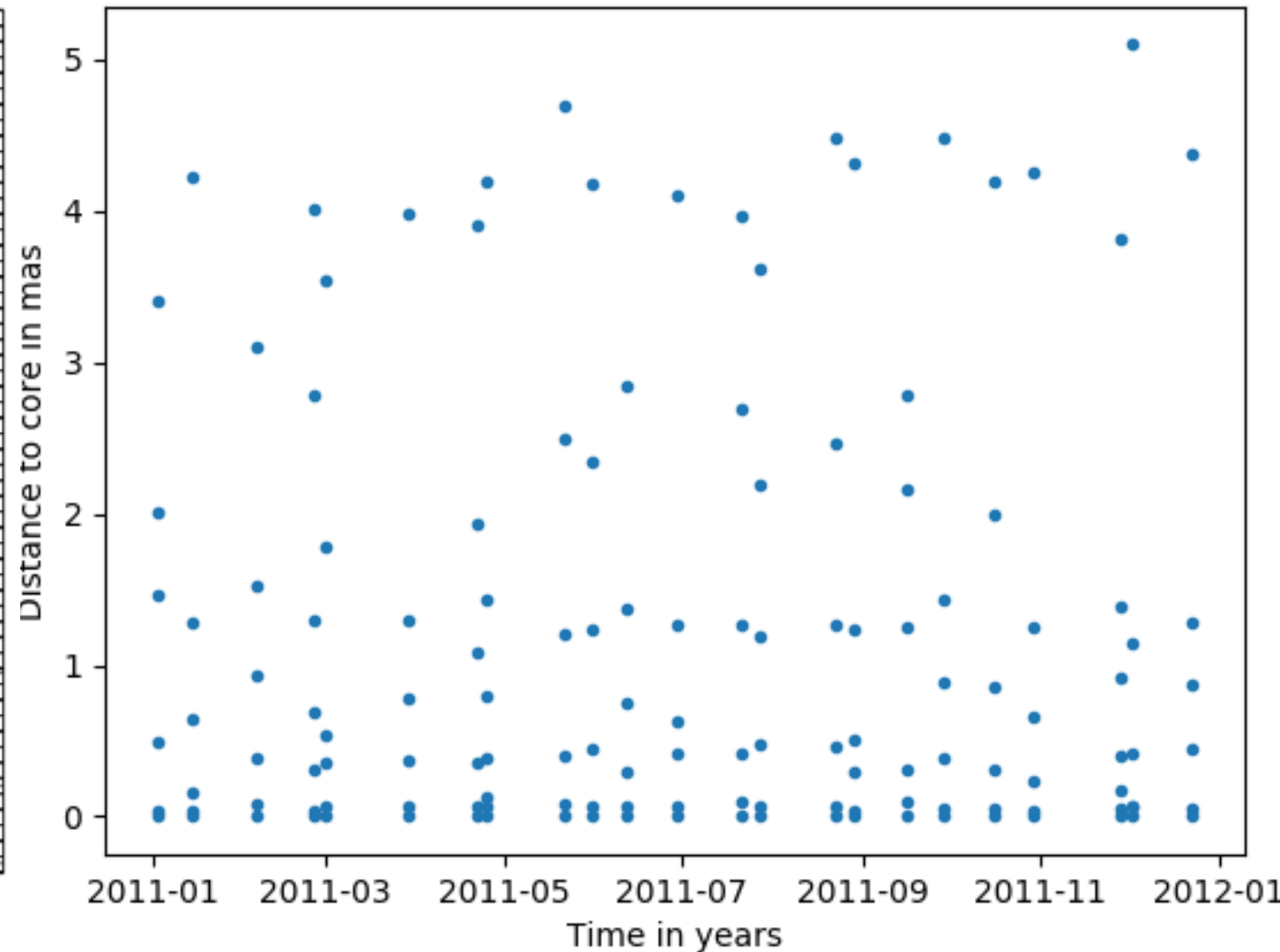
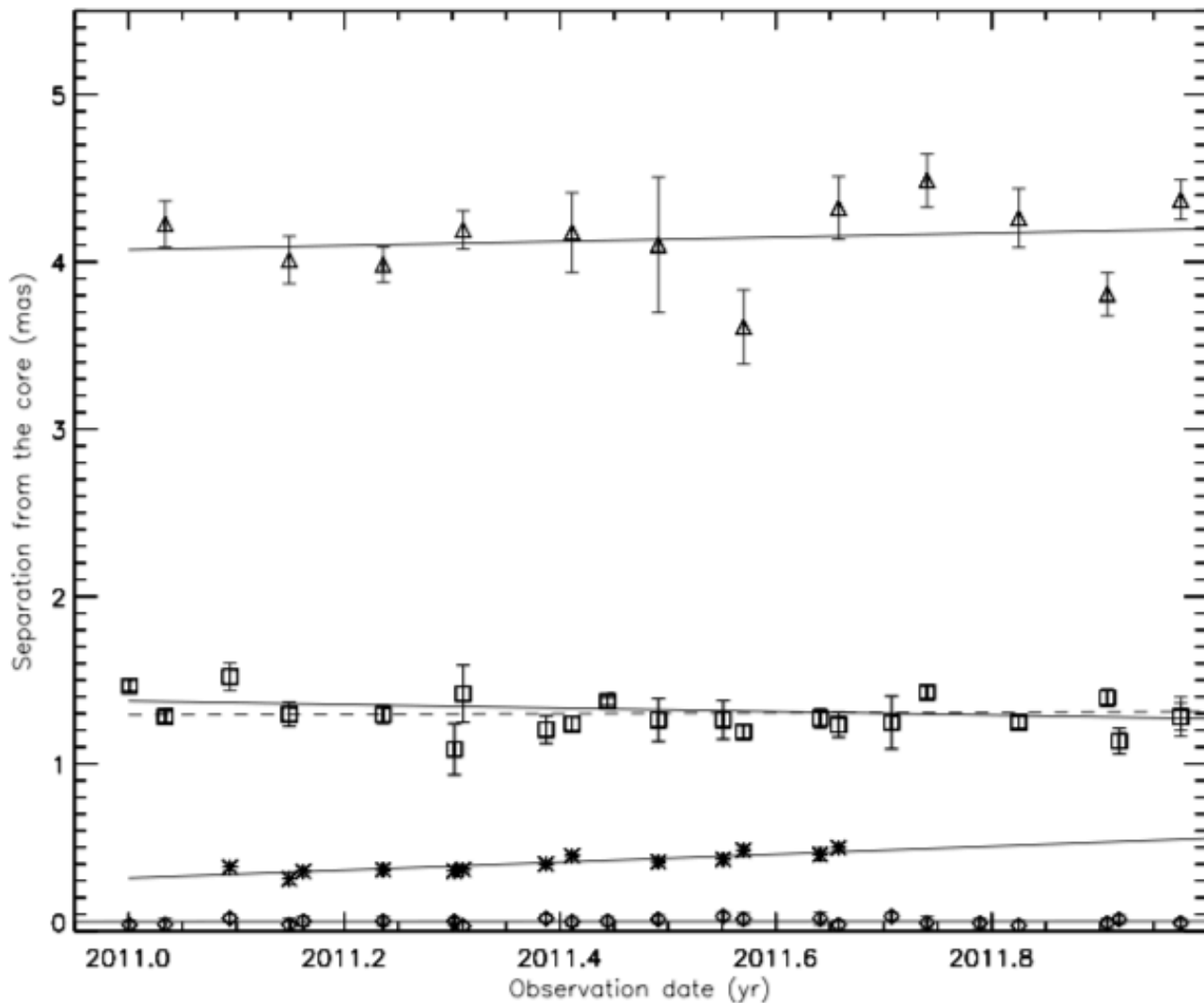
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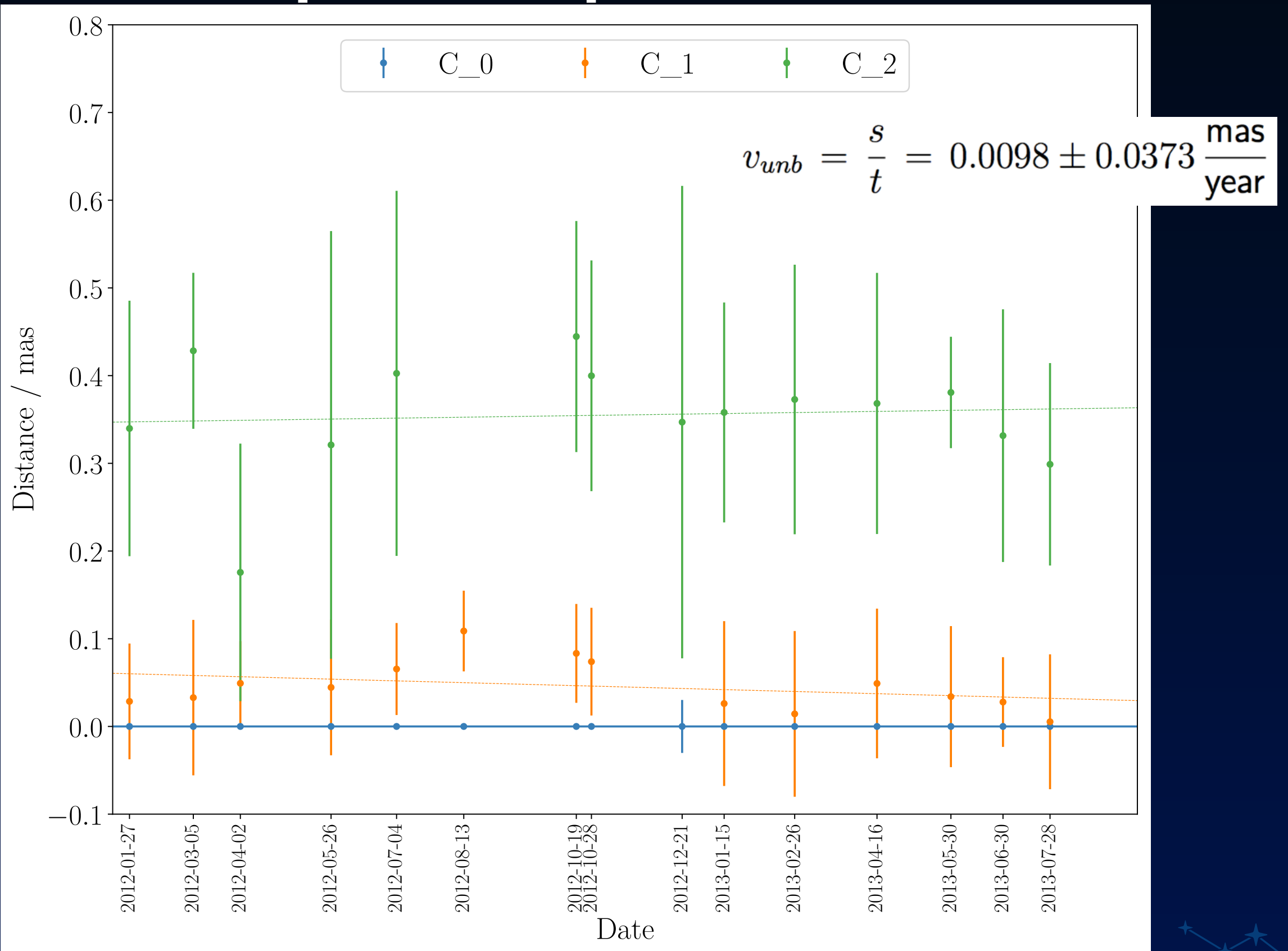
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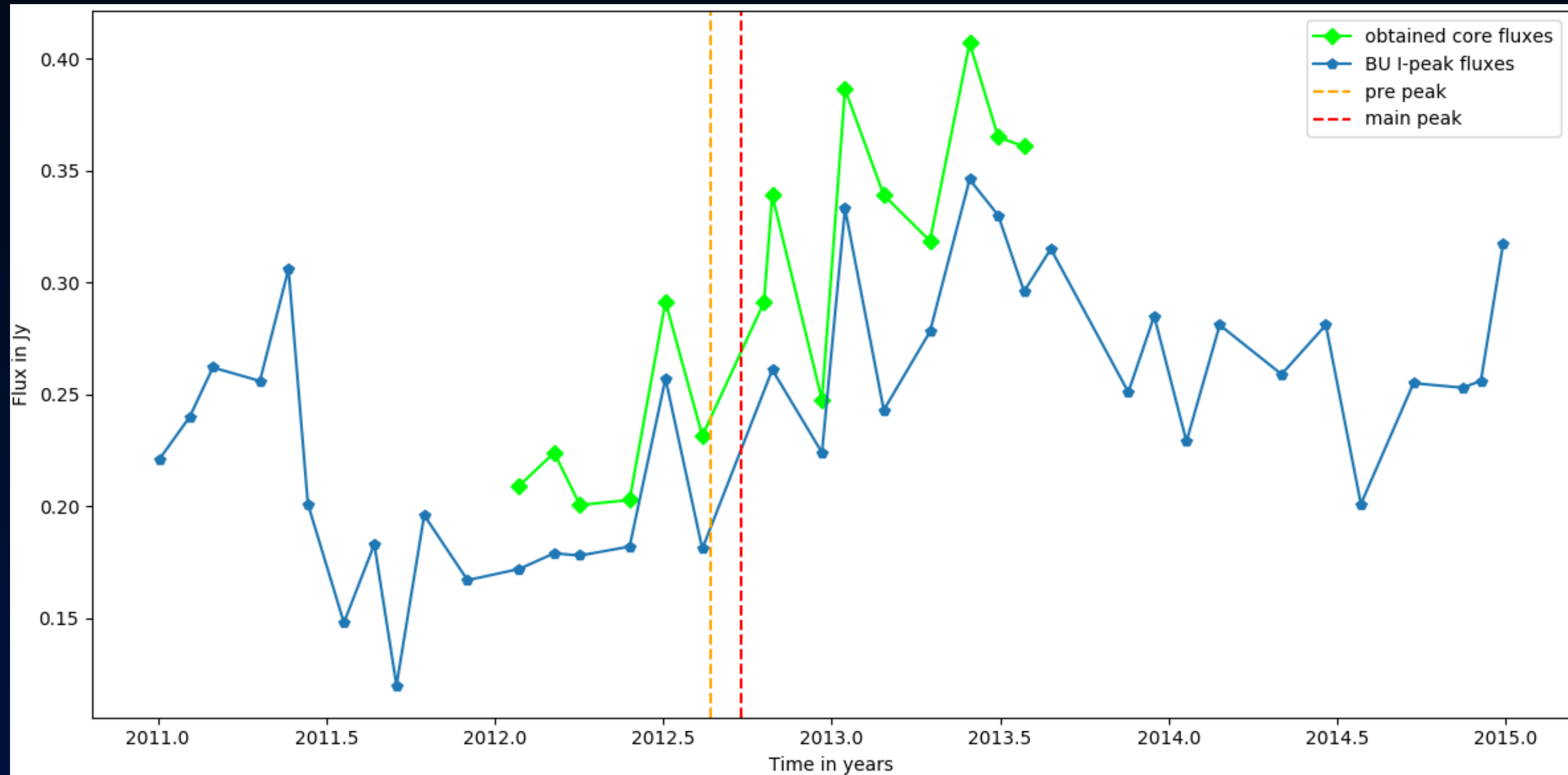
found components



Results: Component Speed



Light curve in 43GHz



- ➔ 2012 flare is not clearly detected in core
- ➔ flare in beginning of 2013 is seen (Hovatta et al. 2015)