

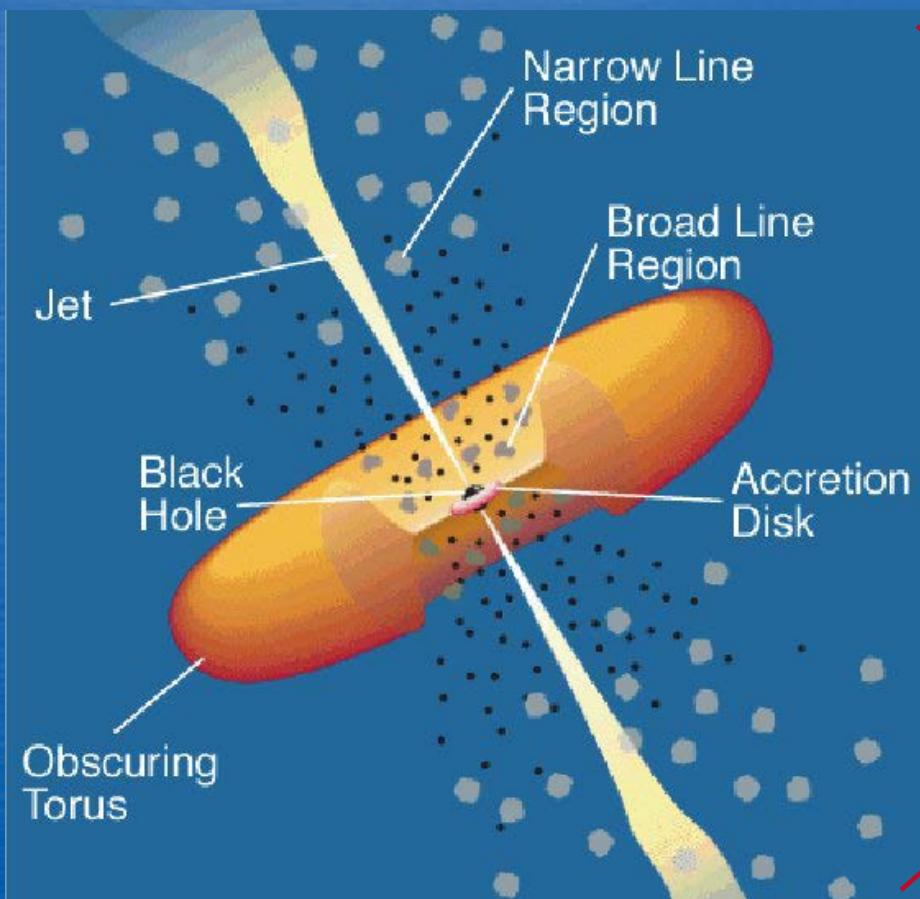
Variability study of AGNs

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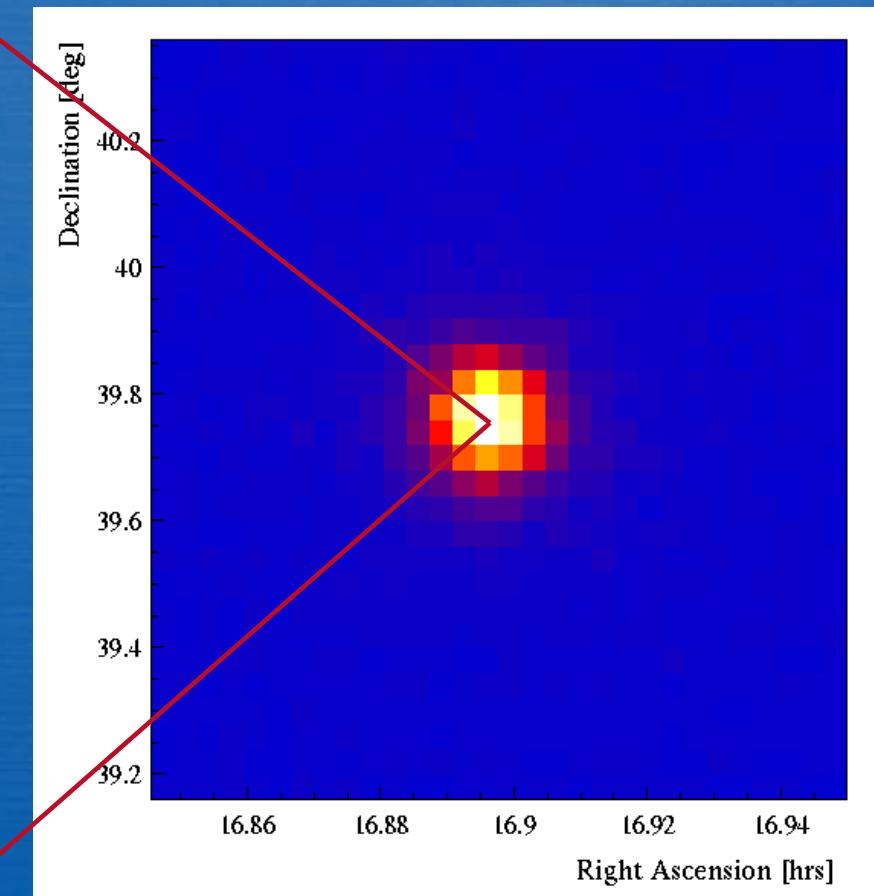
With great thanks to L. Fuhrmann,
N. Marchili, I. Nestoras

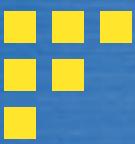
Problem. Idea.

We think



We observe on Effelsberg



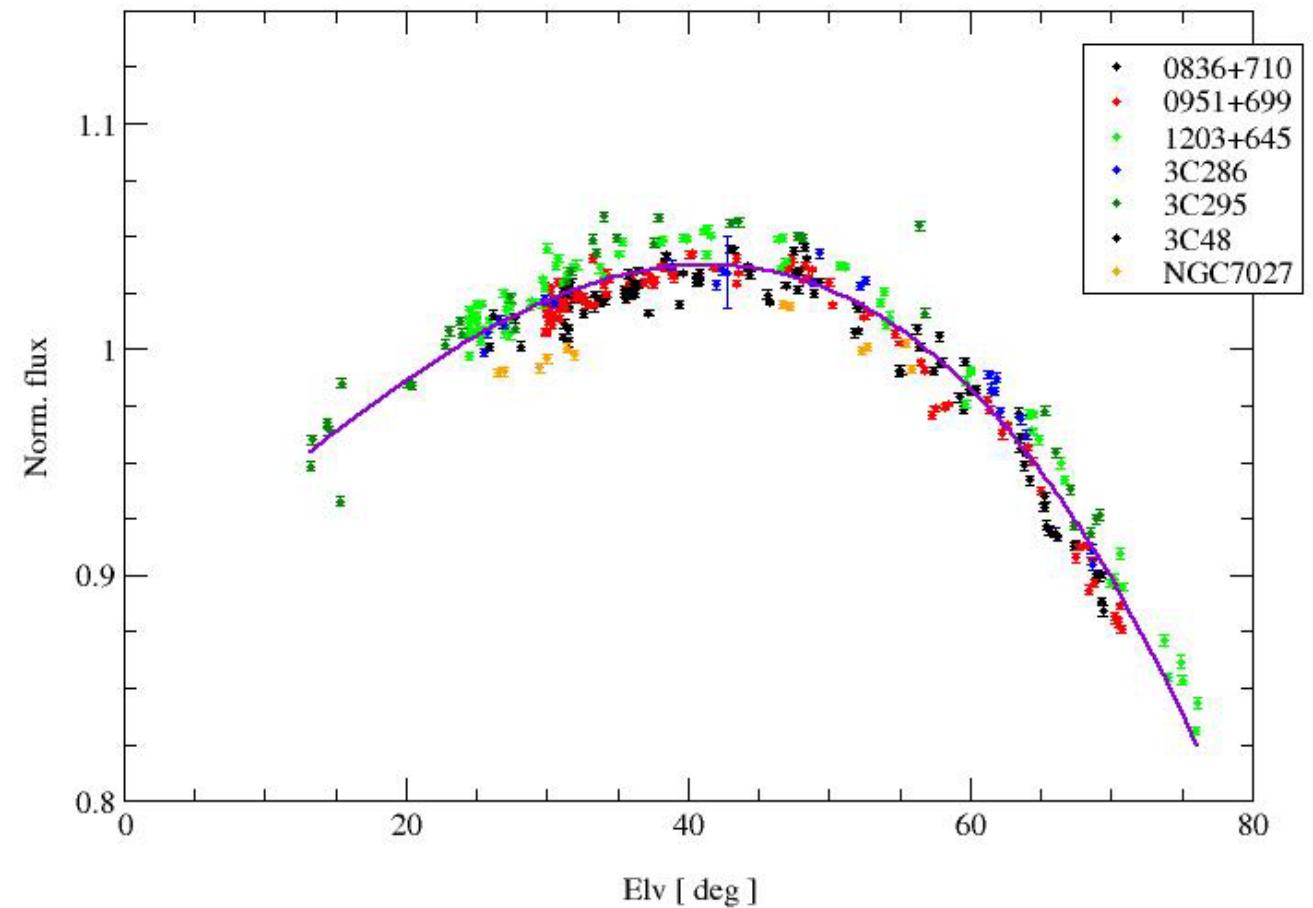


IDV source 1128+592

- Effelsberg
- 5 Ghz
- 3 days of continuous observations

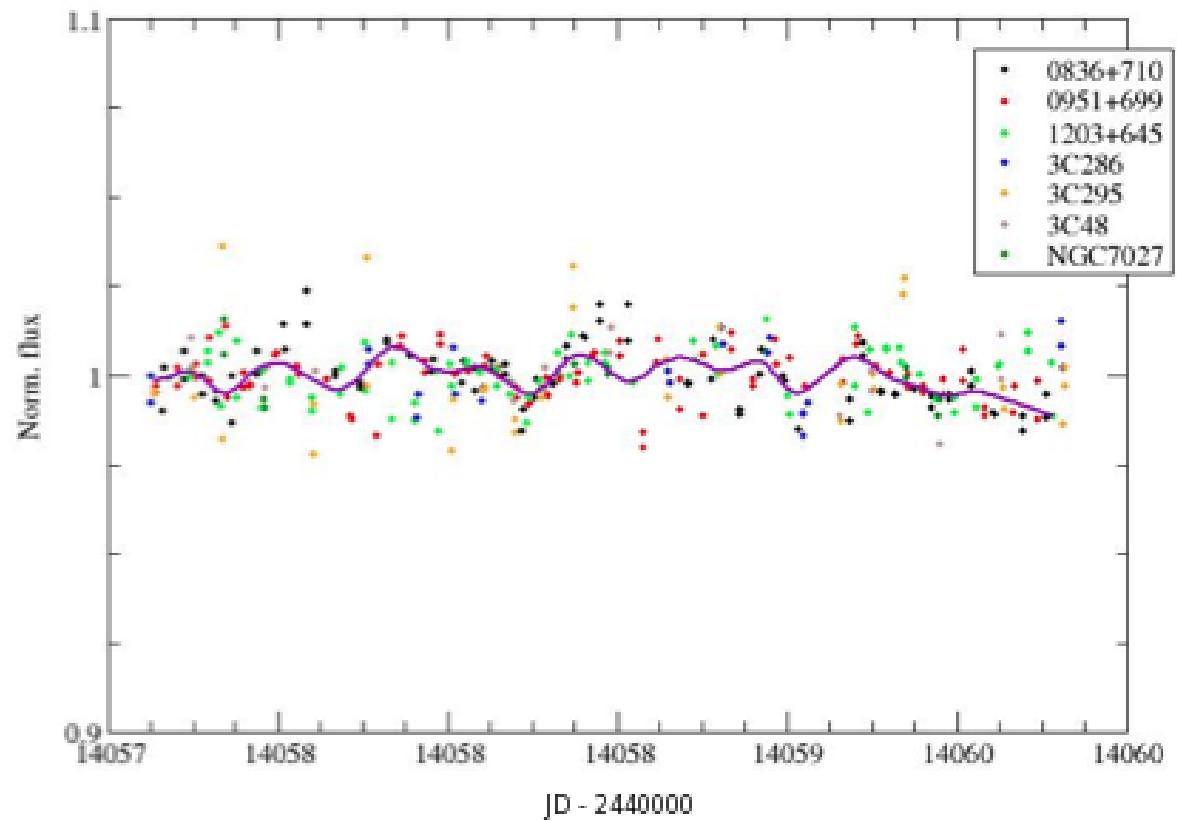
Gain Curve correction

Gain curve
shouldn't
exceed 1



Time correction

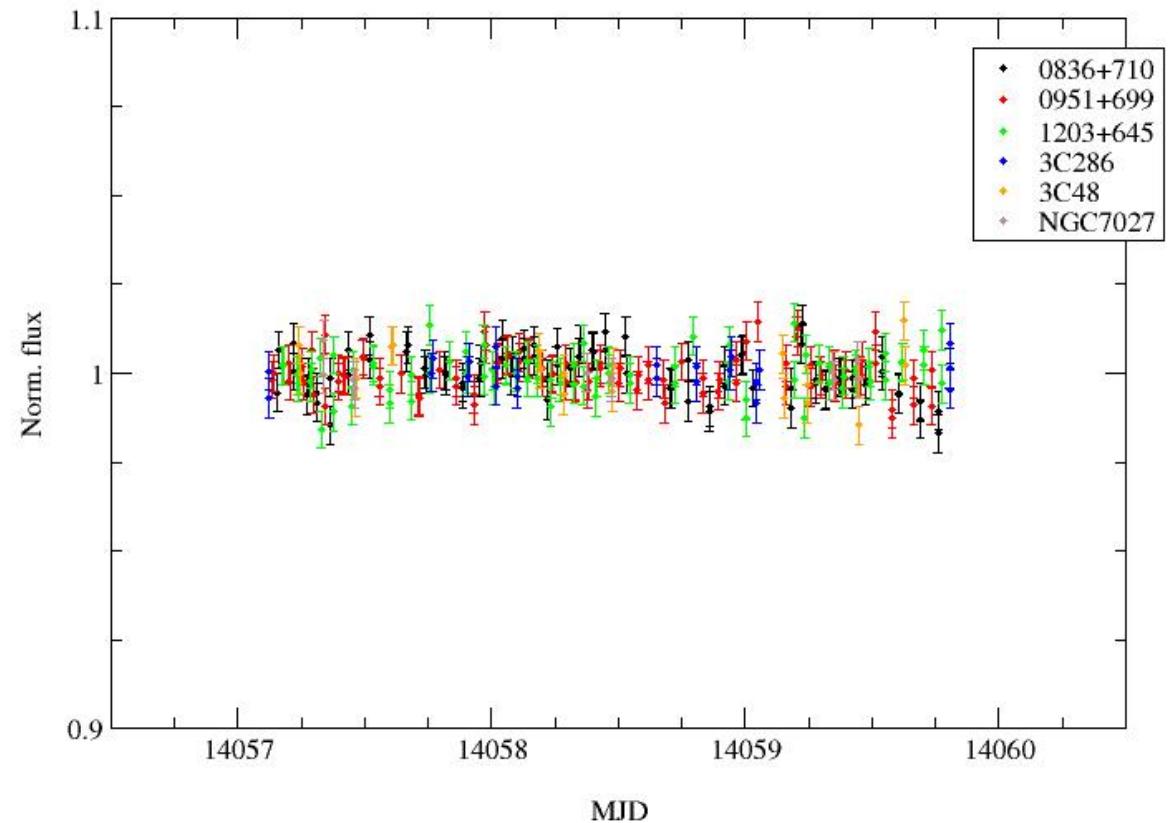
A special correction
for time accuracy.



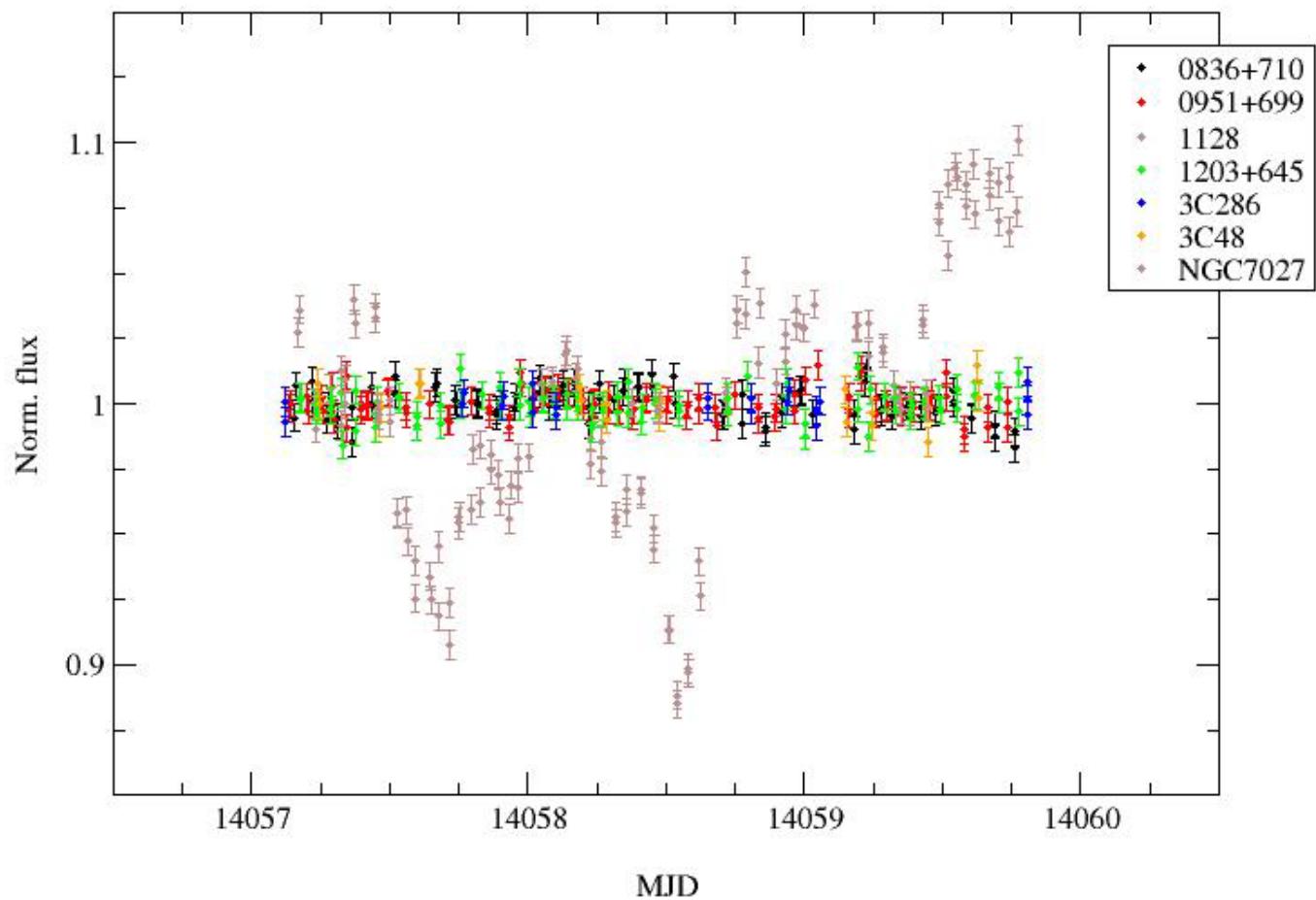
Accuracy is better than 1%

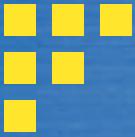
Calibrators

Specifically selected
non variable sources
for data calibration



Final result

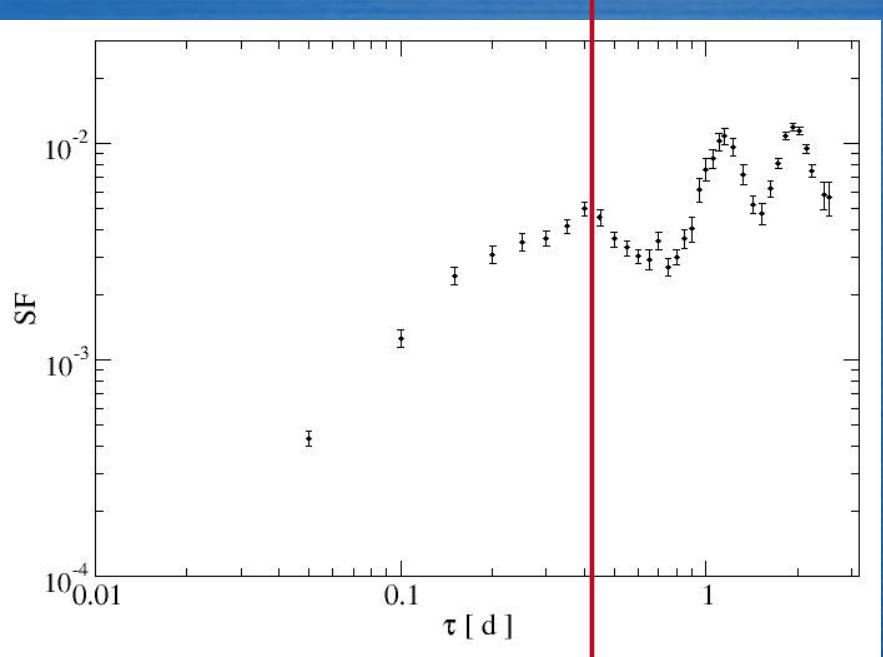
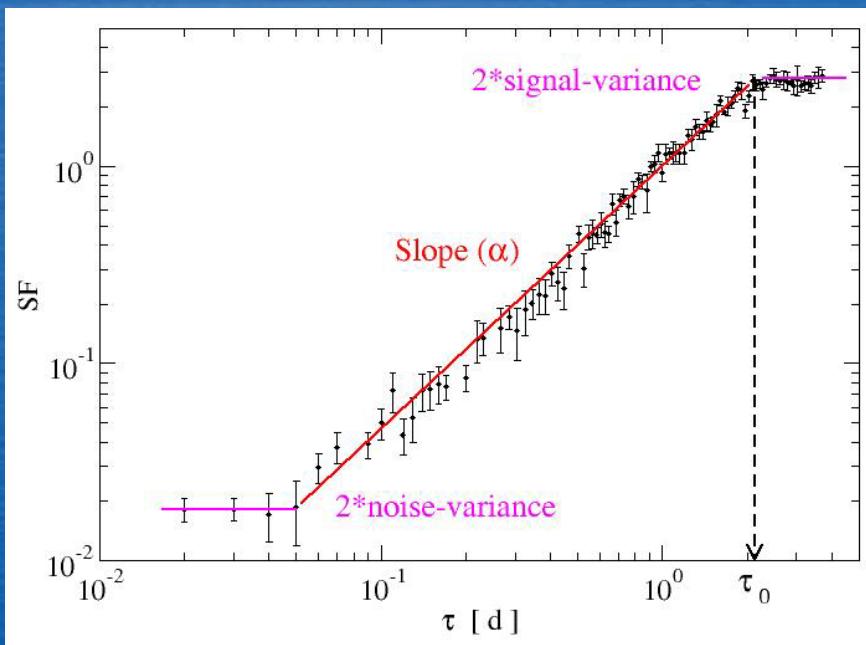




ACCURACY 1%

Analysis 0: Structure function analysis (time scales)

$\tau = 0.4$ day



Analysis 1: is the source variable or not

$$\chi^2 = \sum_{i=1}^N \frac{(S_i - \bar{S})^2}{\sigma_i^2}; \quad \leq 0.1\%$$

$$m = 100 \cdot \frac{\sigma}{\bar{S}} \quad \text{modulation index}$$

$$Y = 3\sqrt{(m^2 - m_0^2)} \quad \text{amplitude variability}$$

$23 \pm 1\%$ flux variability at 5 GHz

Analysis 2: Deriving physical parameters

Variability time scale: $t = 0.4$ day

Size:

$$\theta = 0.159 \text{ } \mu\text{as}$$

45.4 μas (Doppler corrected)

$$\theta = 0.13 \frac{t_{\text{var}}}{d_L} \delta(1 + z)$$

Brightness temperature:

$$T_B = 0.1058E+19 \text{ K}$$

$$T_B = 8.47 \times 10^4 \cdot S_\lambda \left(\frac{\lambda d_L}{t_{\text{var},\lambda} (1 + z)^2} \right)^2$$

Dopler-Factor:

$$\delta = 285.3$$

$$\delta_{\text{var,IC}} = (1 + z)^{3+\alpha} \sqrt[T_B^{\text{app}} / 10^{12}]$$

Magnetic field:

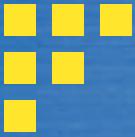
$$B_{\text{field}} = 0.103 \text{ mG}$$

Calculations done for logarithmic 2ct time scale.

Redshift $z = 1.8$;

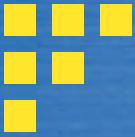
Luminosity distance 13401 Mpc; 8.287 pc/mas;

$$T_B^{\text{app}} \sim \delta^3 \times T_B^{\text{lim}}$$



Future plans

- Multifrequency study of IDV objects
- Spectra analyzing
- VLBI observations



- Thank you