Single Station LOFAR Processing

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Leonardo Epifani
Ioannis Myserlis
Victor H De la Luz
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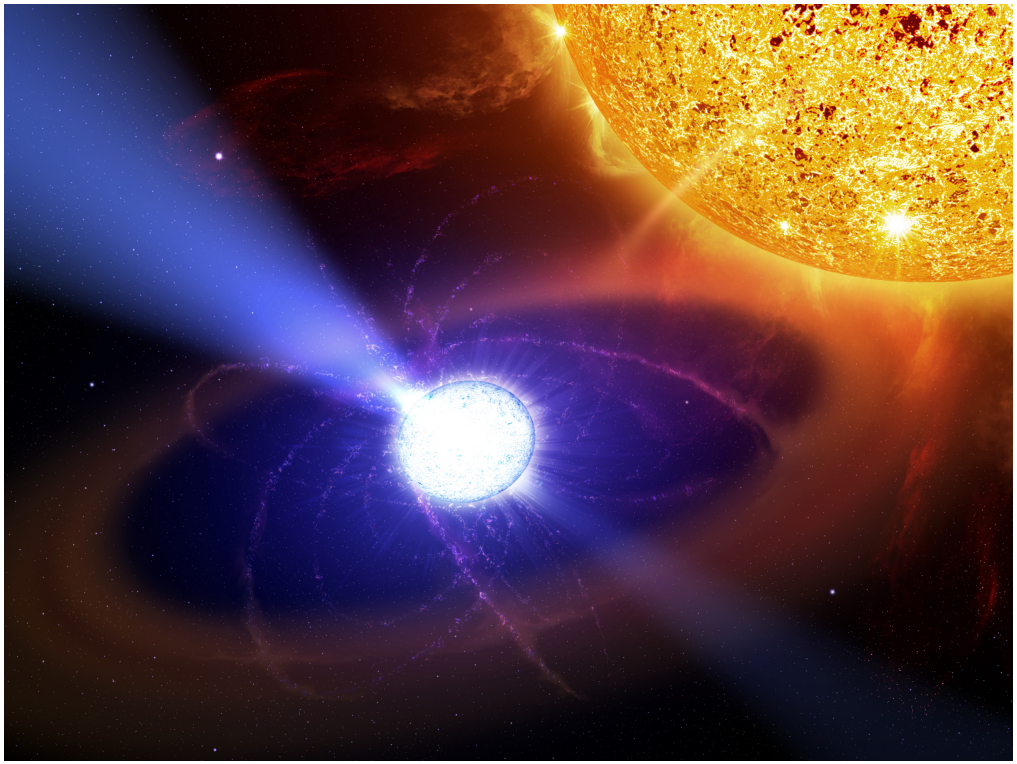
Ewan Barr
Philippe-A. Bourdin



Tutors: Aris Noutsos, James Anderson, Masaya Kuniyoshi

Outline

1) Dedispersion

2) Observing with LOFAR

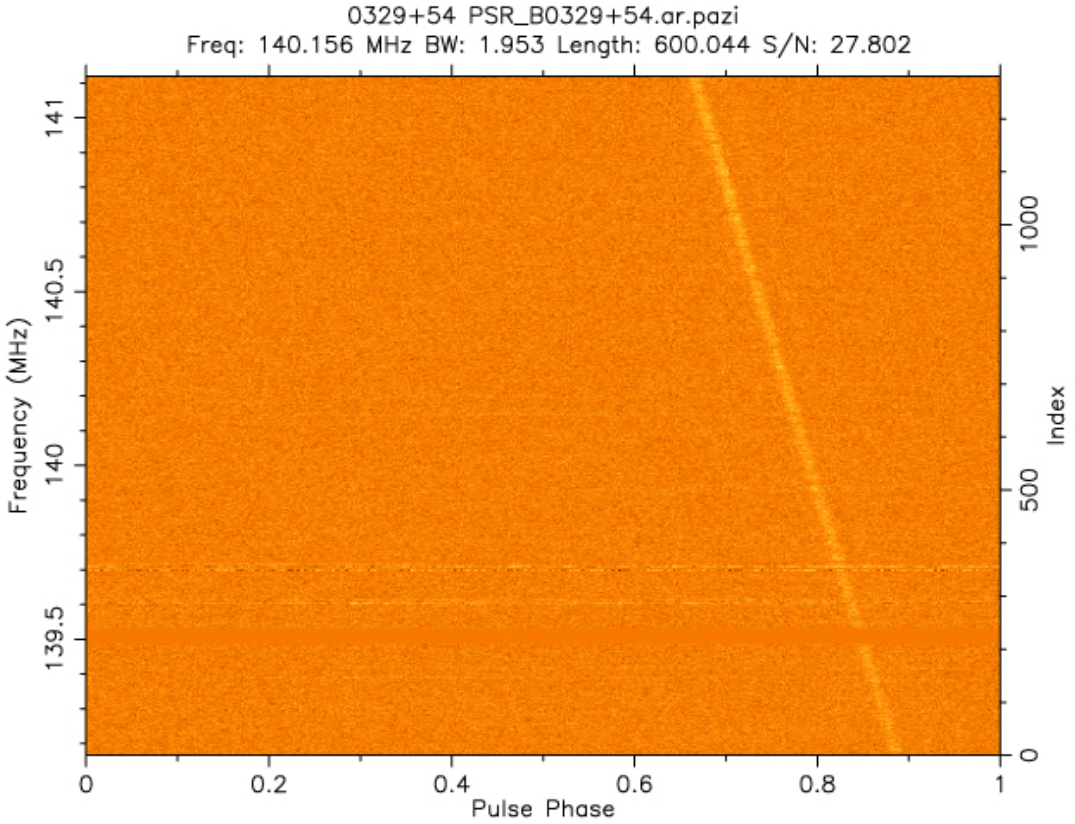
3) Rotation Measures

4) Comparision with Literature

B0329+54

B0329+54

Dispersed:



B0329+54

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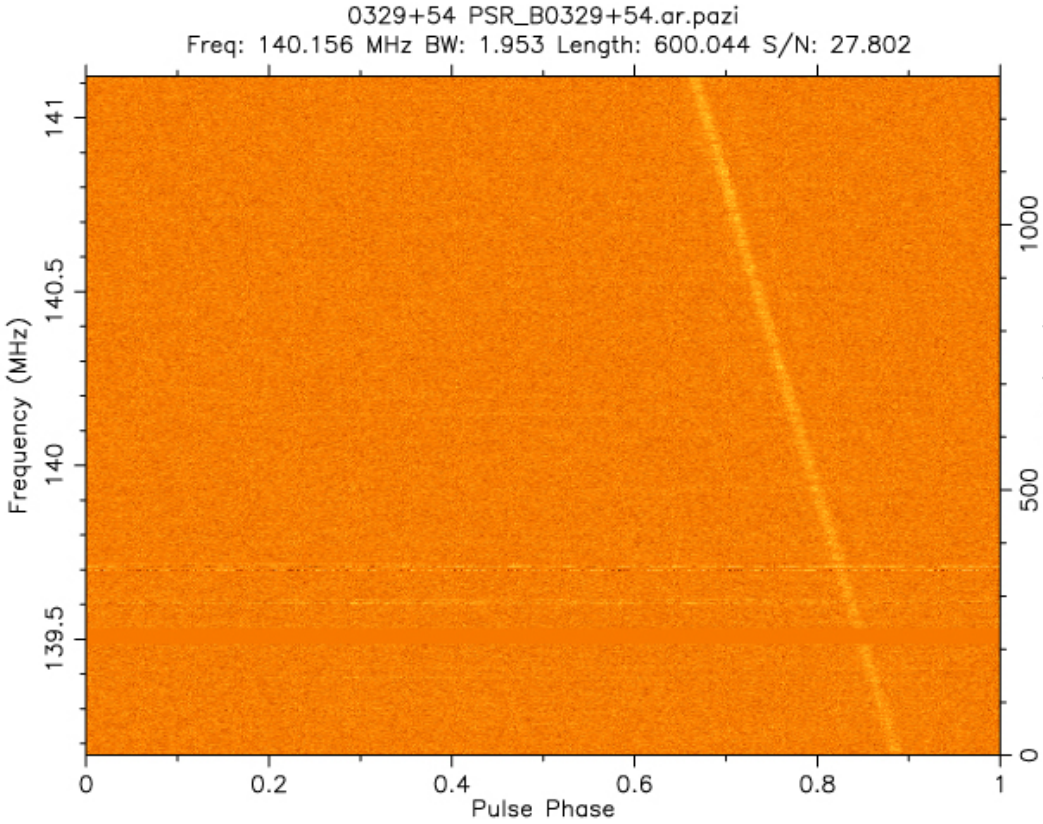
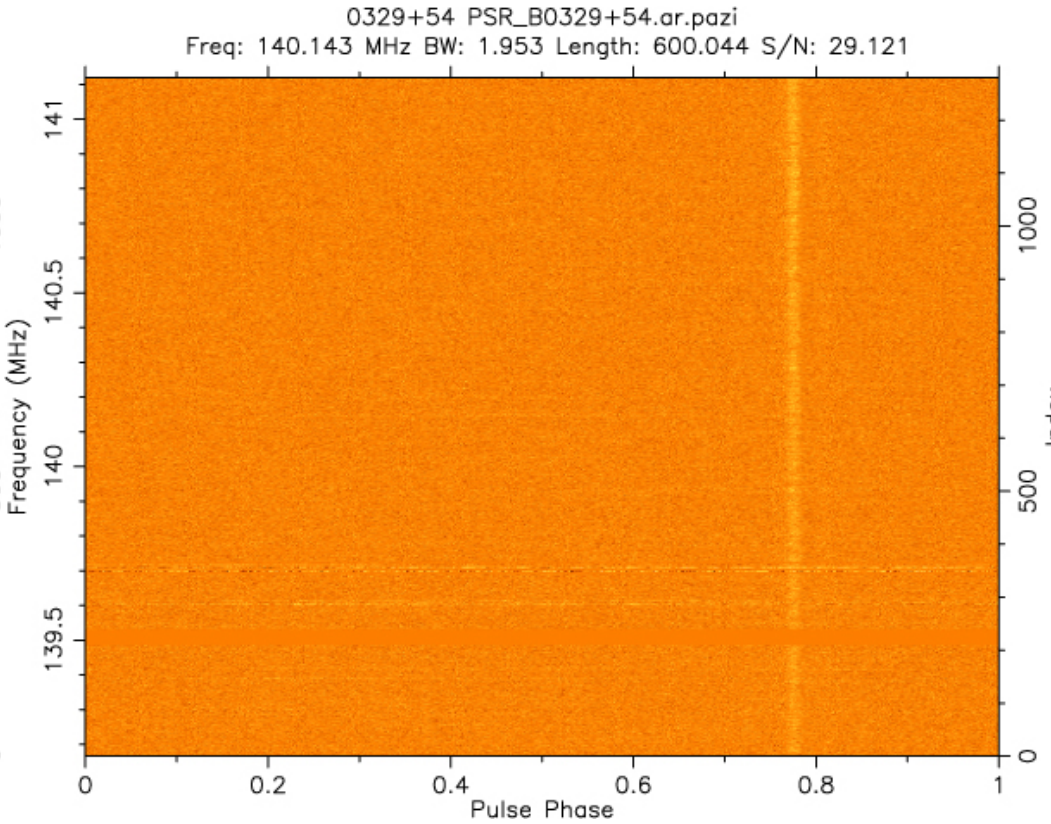


De-dispersed:



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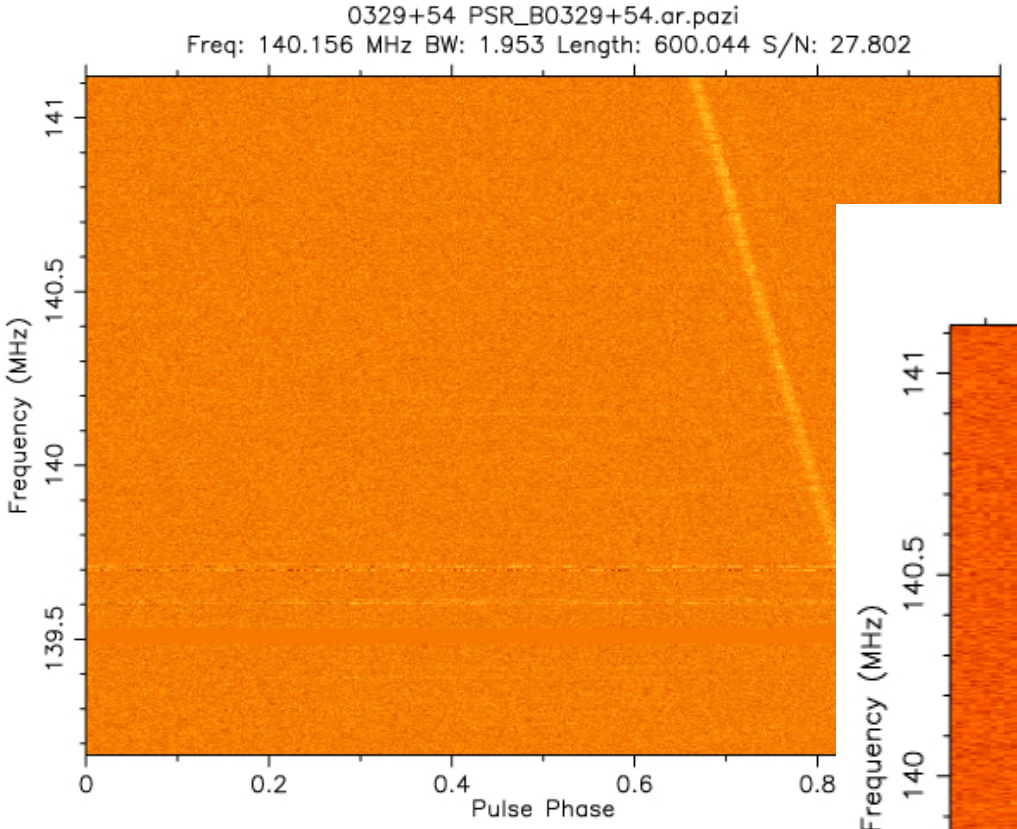
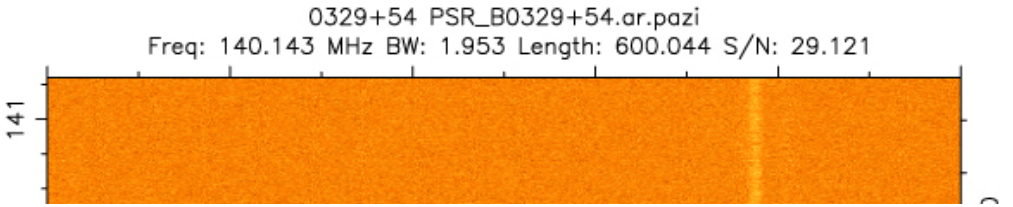
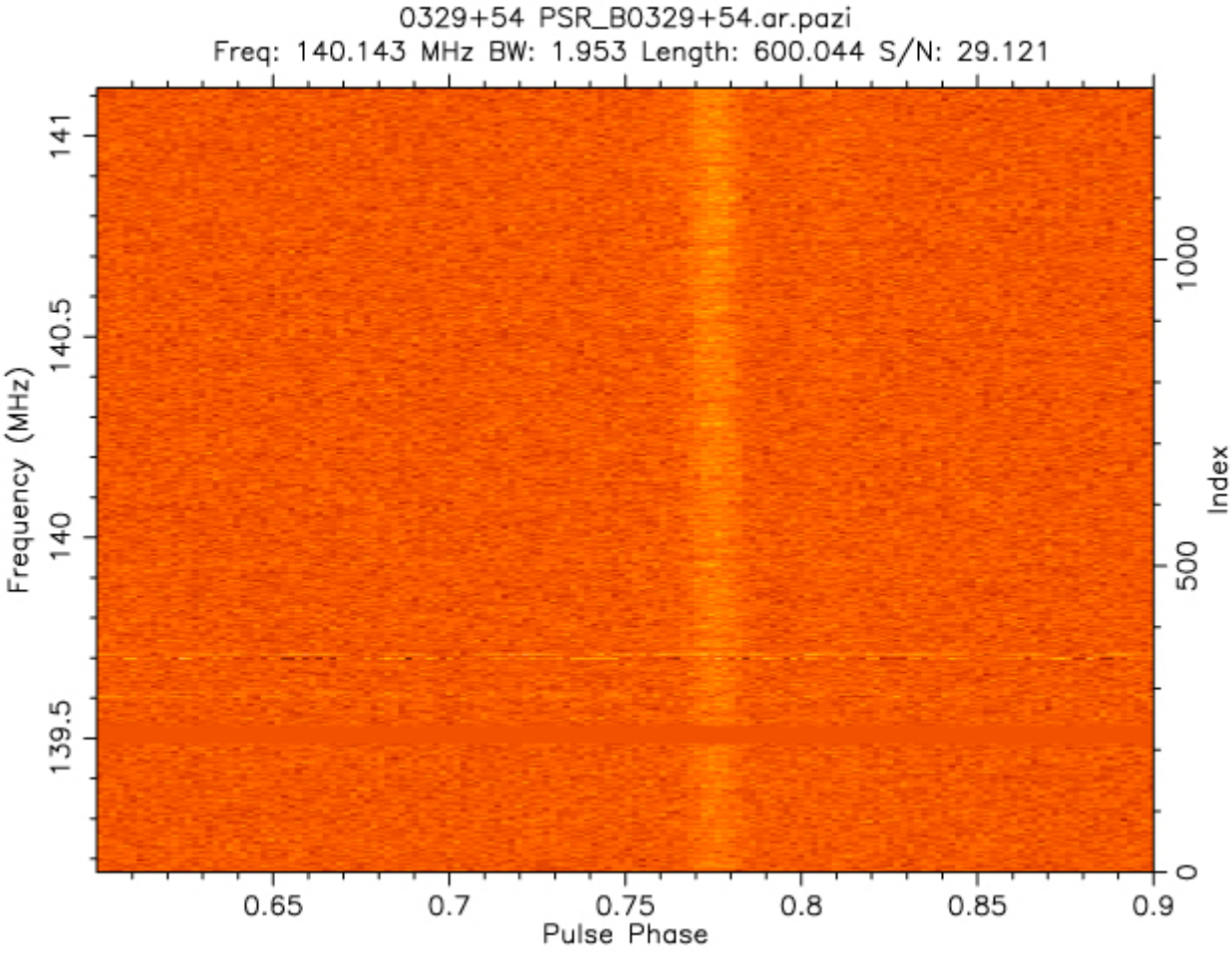


De-dispersed:





Observed data from B0329+54:

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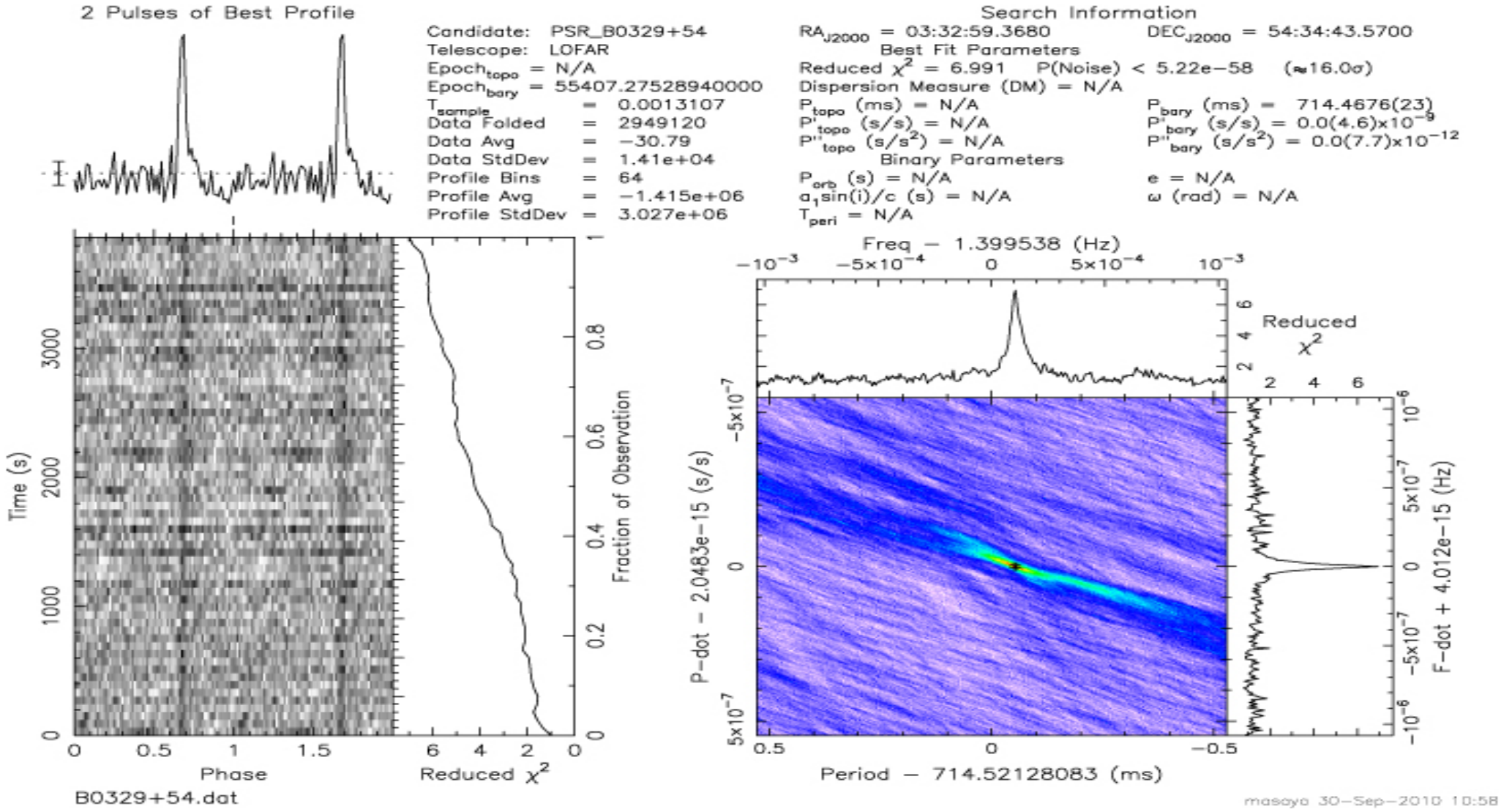
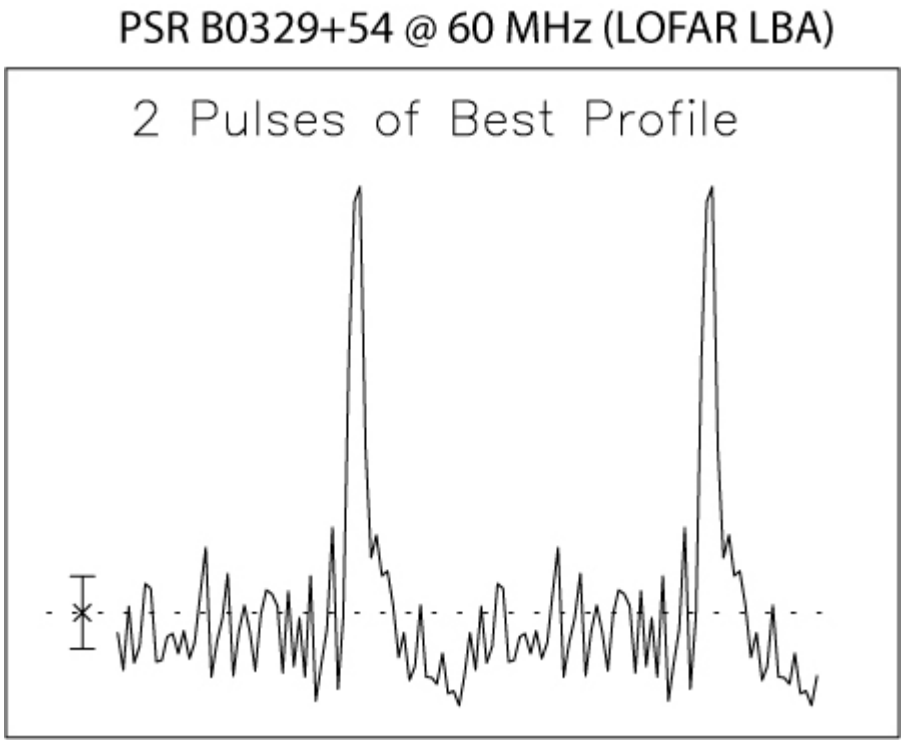
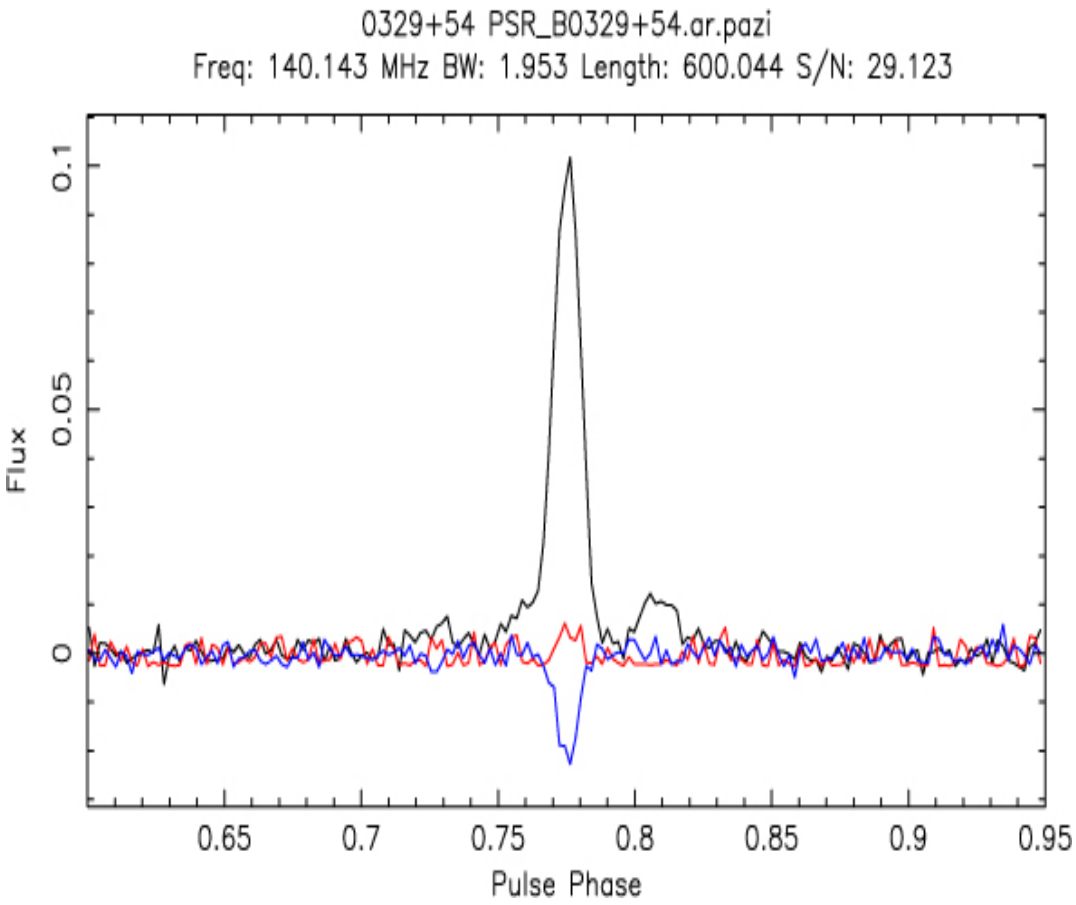


Observed data from B0329+54:

60 MHz (LBA, time series):



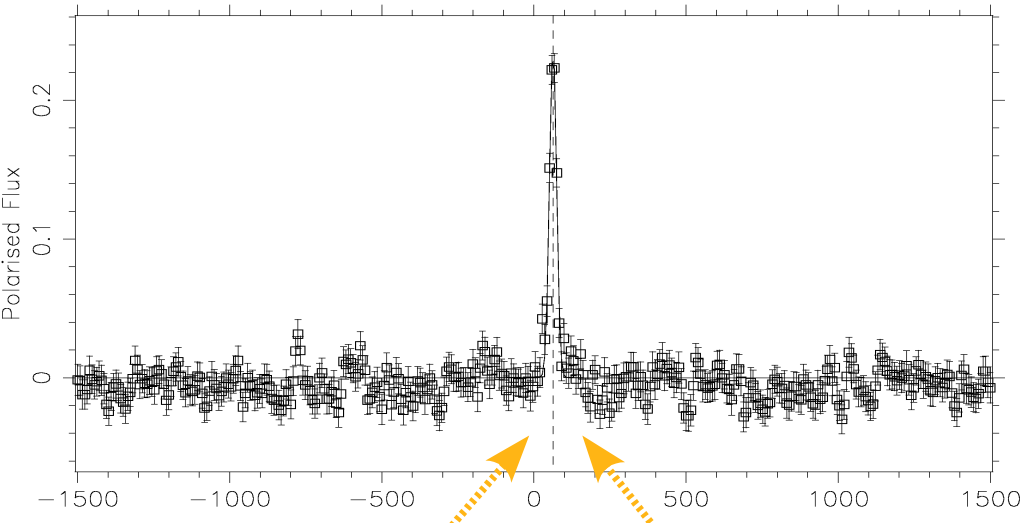
140 MHz (HBA, folded):

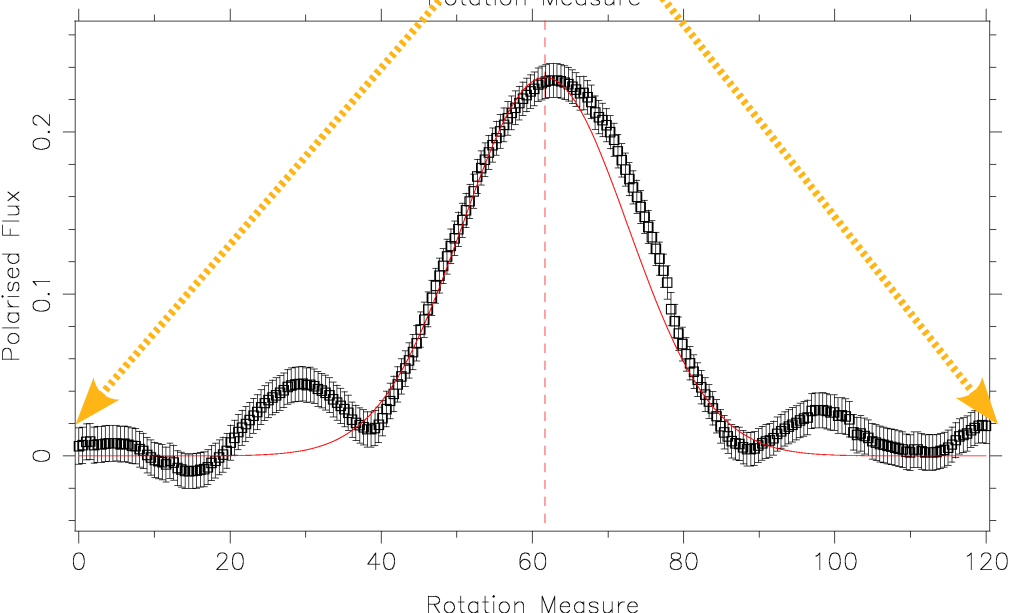


(black: flux, red: linear polarization, blue: circular polarization)

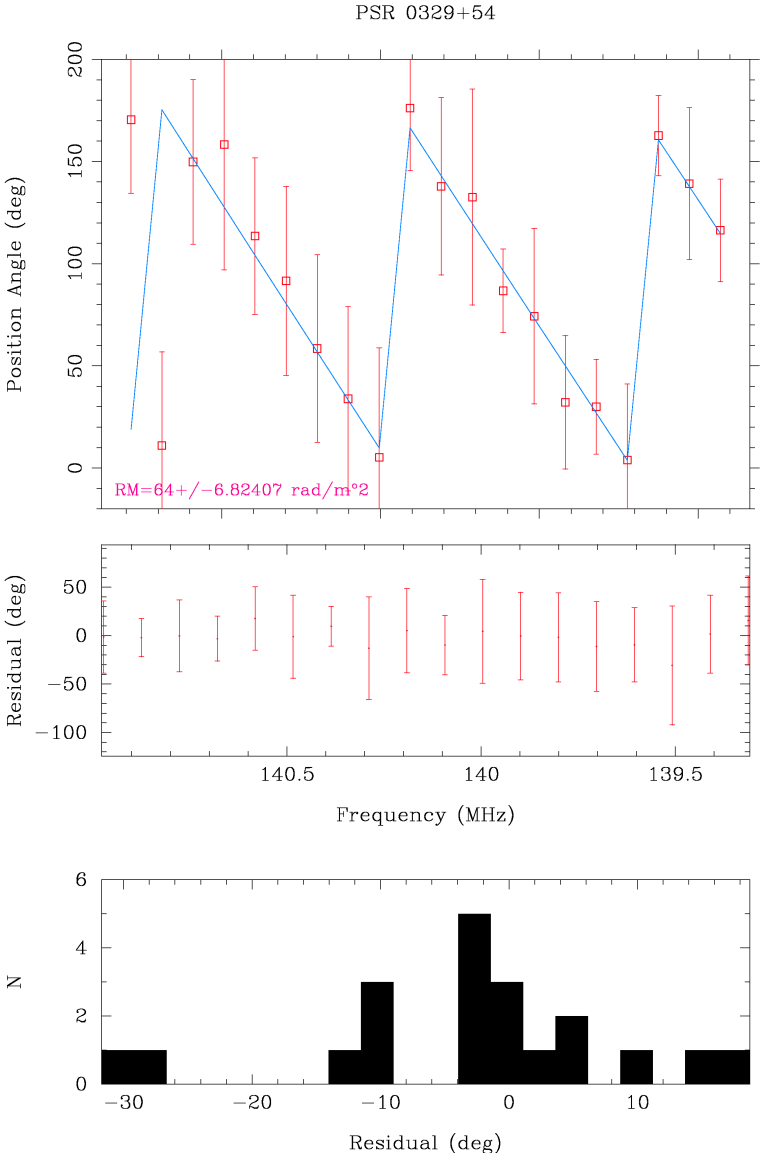
Observed data from B0329+54:

Trial and error using linear polarization:





χ^2 fitting using Polarization Angle:



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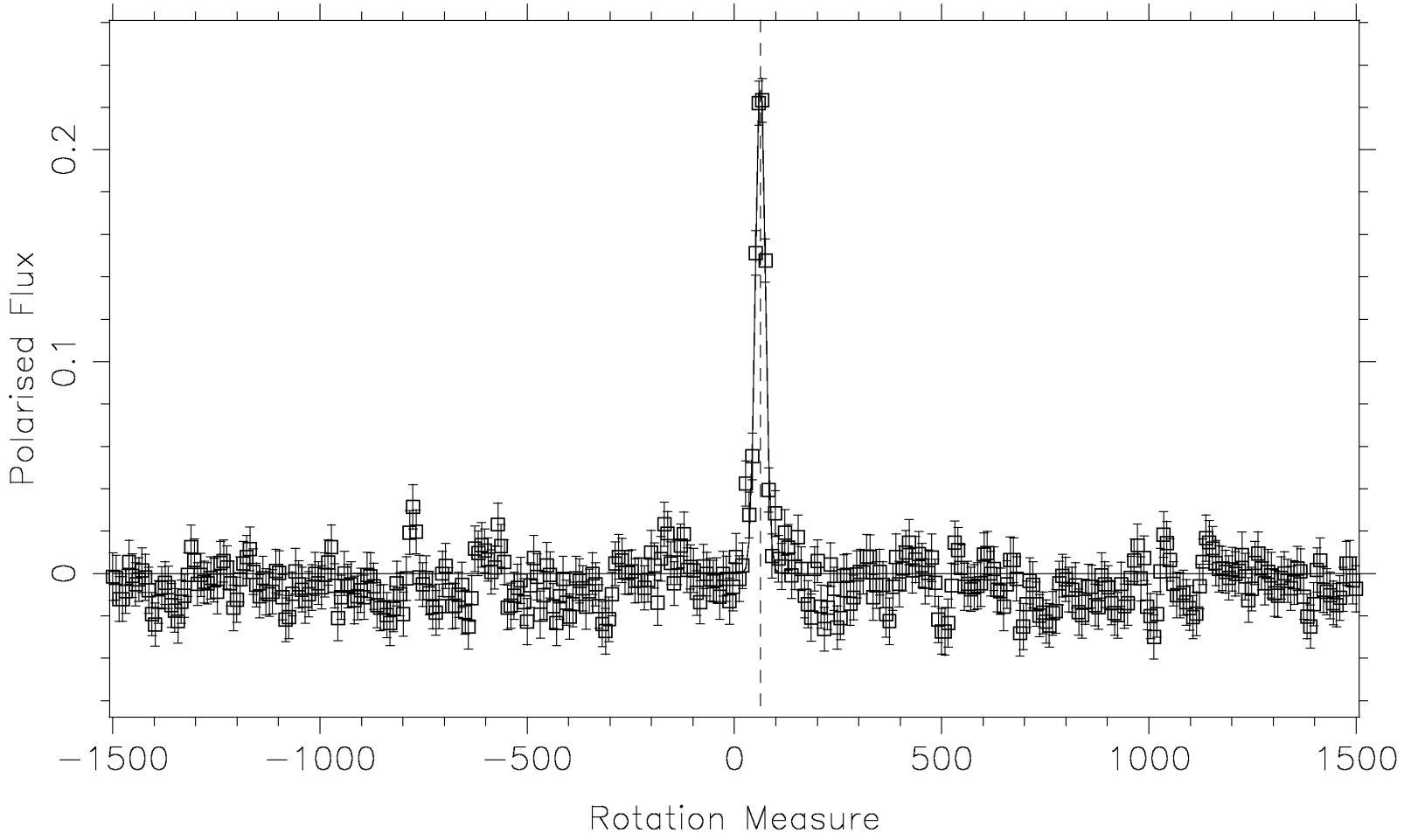

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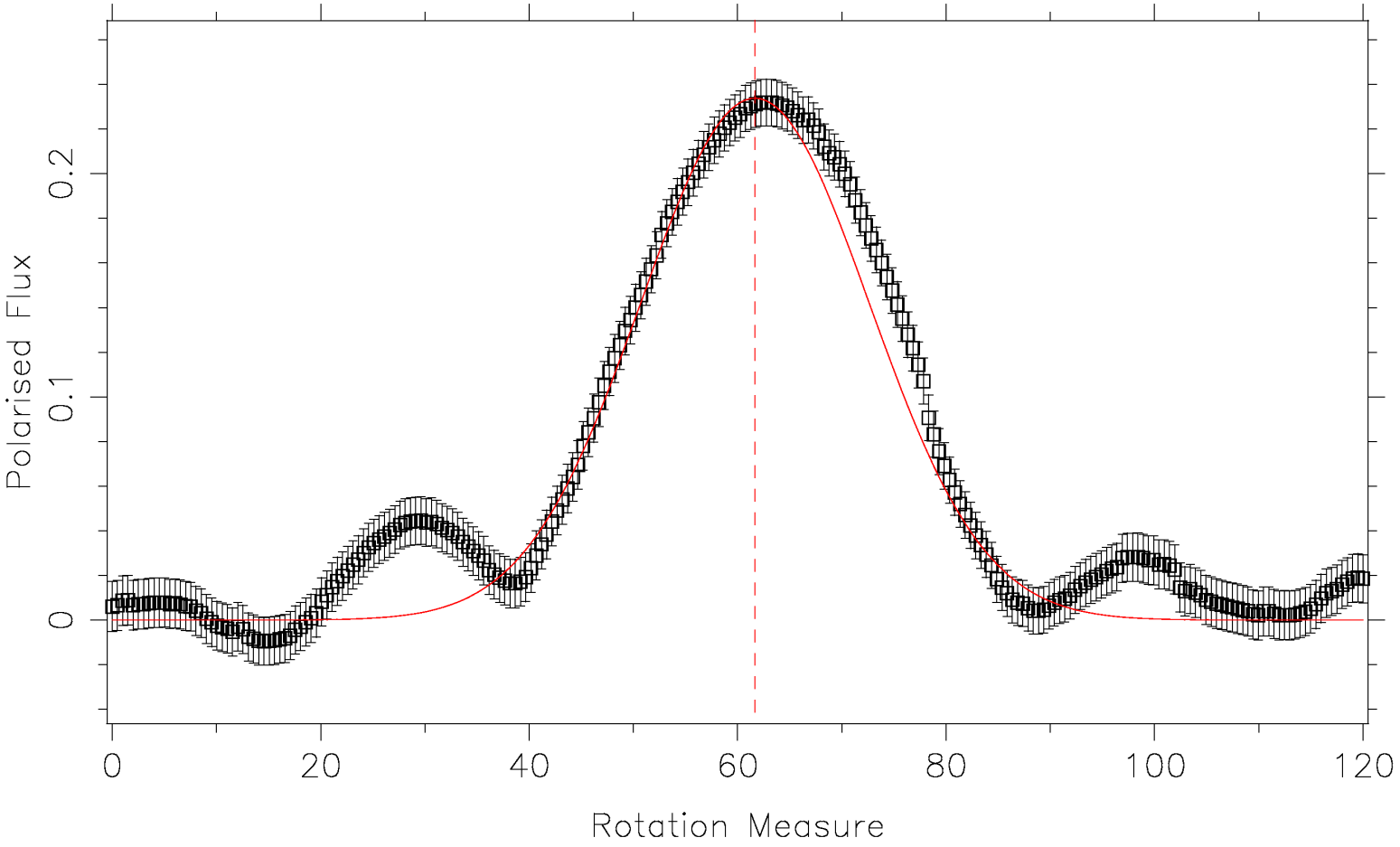

Rotation Measure of B0329+54:

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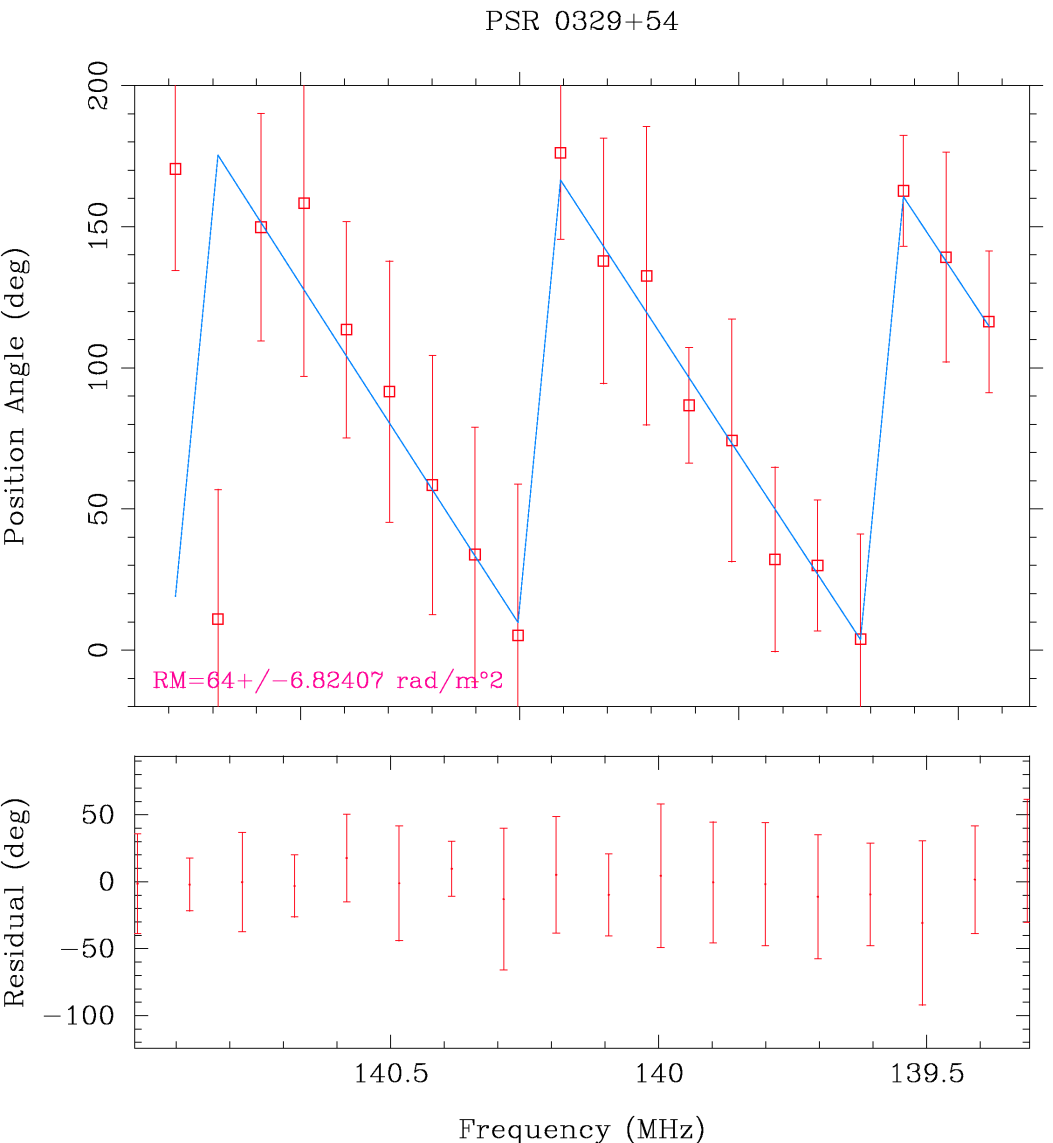
χ^2 fitting using Polarization Angle:

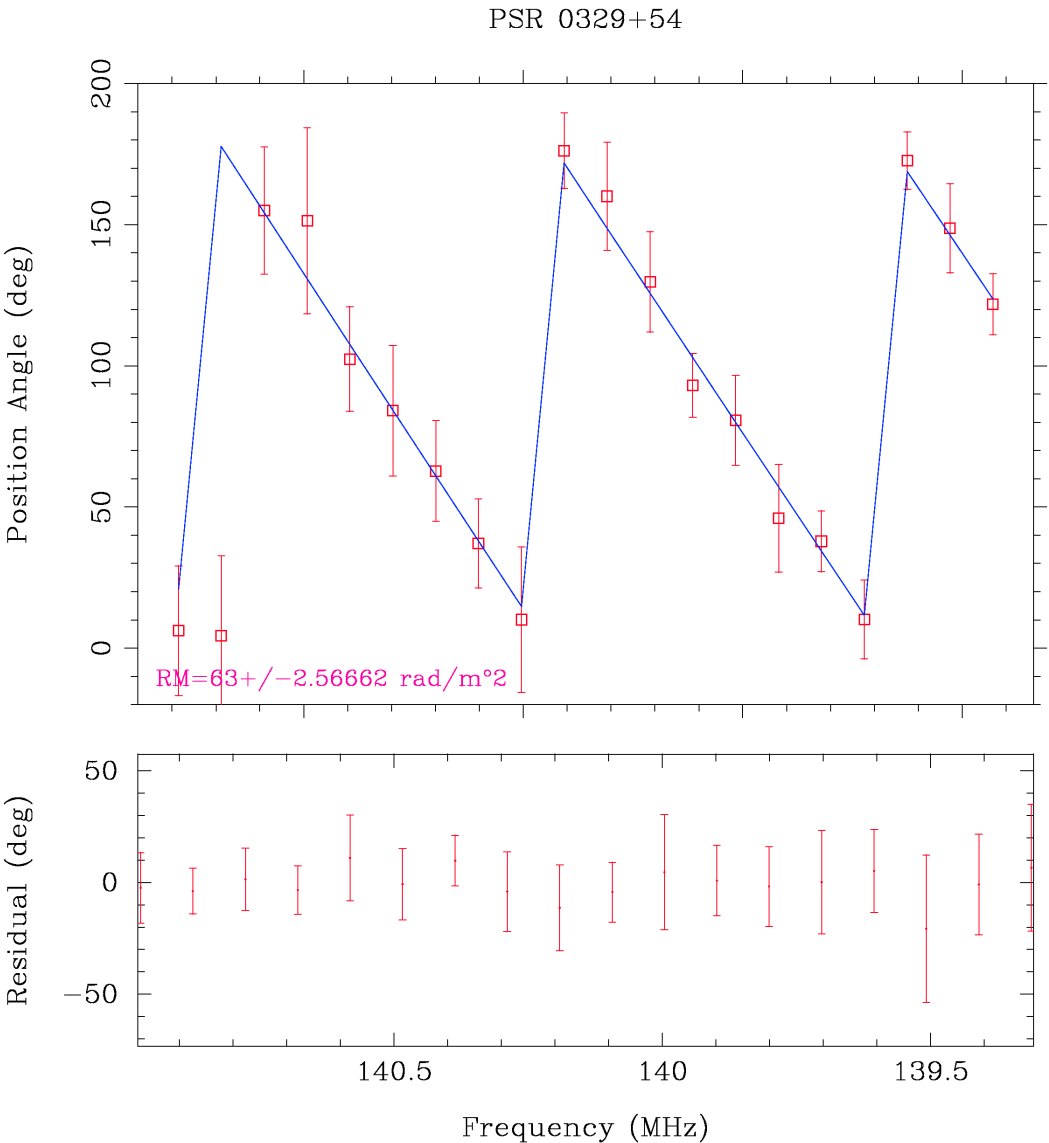
[0.75 , 0.82]

=> RM = 64 ± 6.8 rad/m^2

[0.76 , 0.785]

=> RM = 63 ± 2.6 rad/m^2





Rotation Measure of B0329+54:

Trial and error using linear polarization:

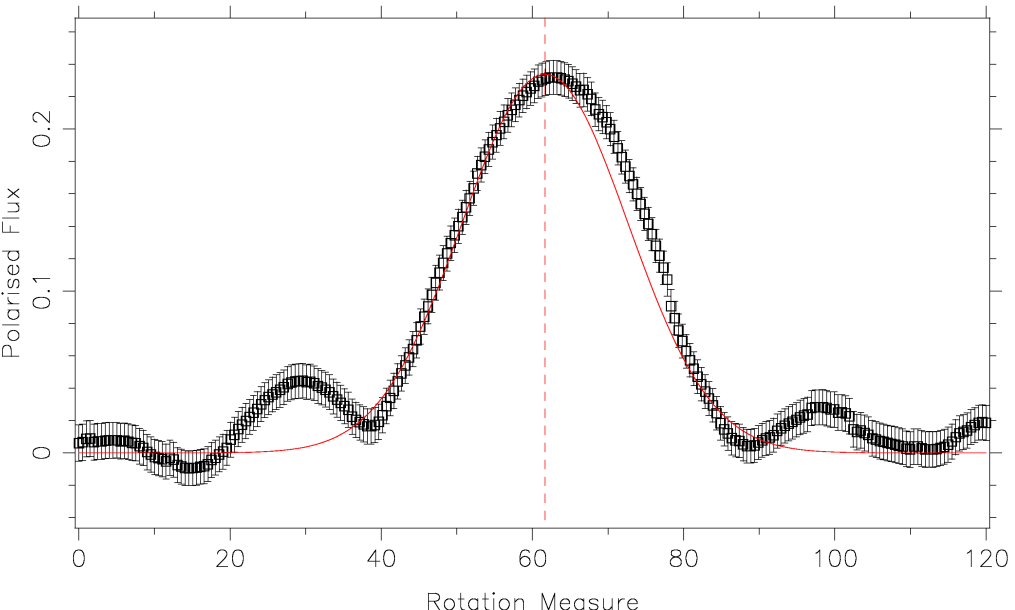
Centre = 62.8
Width = 28.1
Height = 0.23

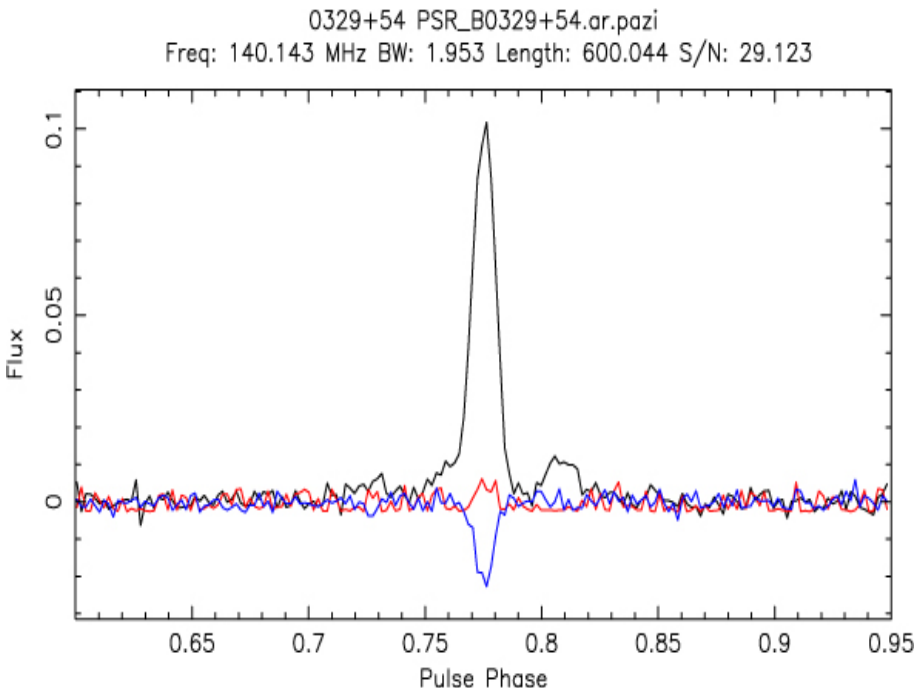
=> RM = 61.7 ± 3.1 rad/m^2

χ^2 fitting using Polarization Angle:

[0.75 , 0.82]
=> RM = 64 ± 6.8 rad/m^2

[0.76 , 0.785]
=> RM = 63 ± 2.6 rad/m^2





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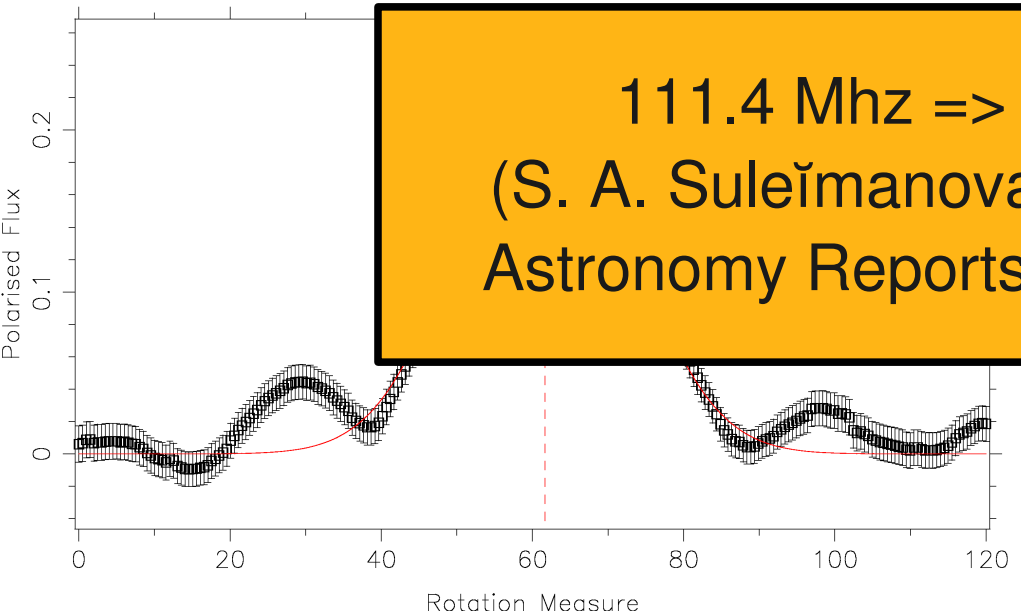
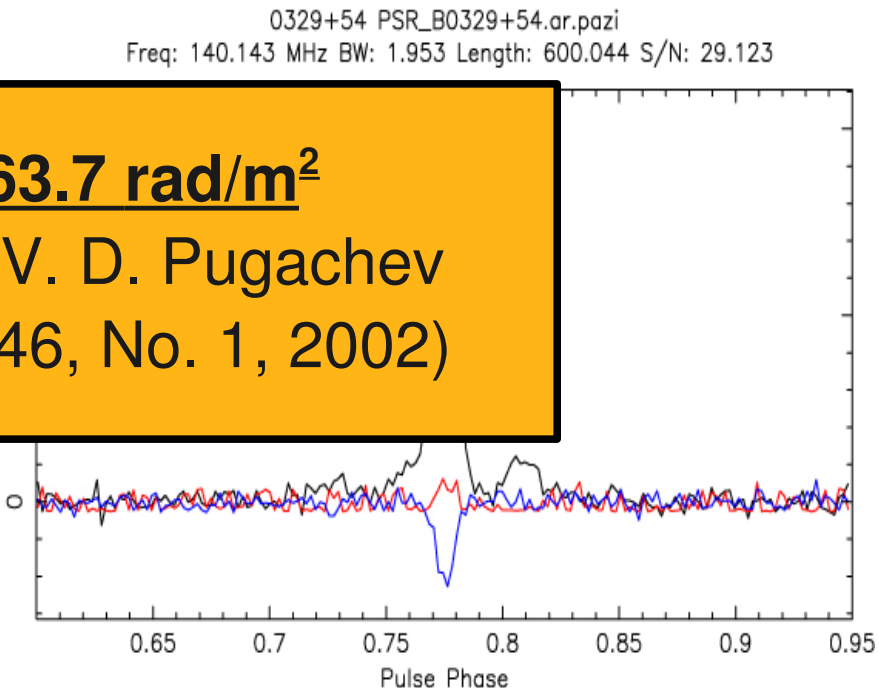
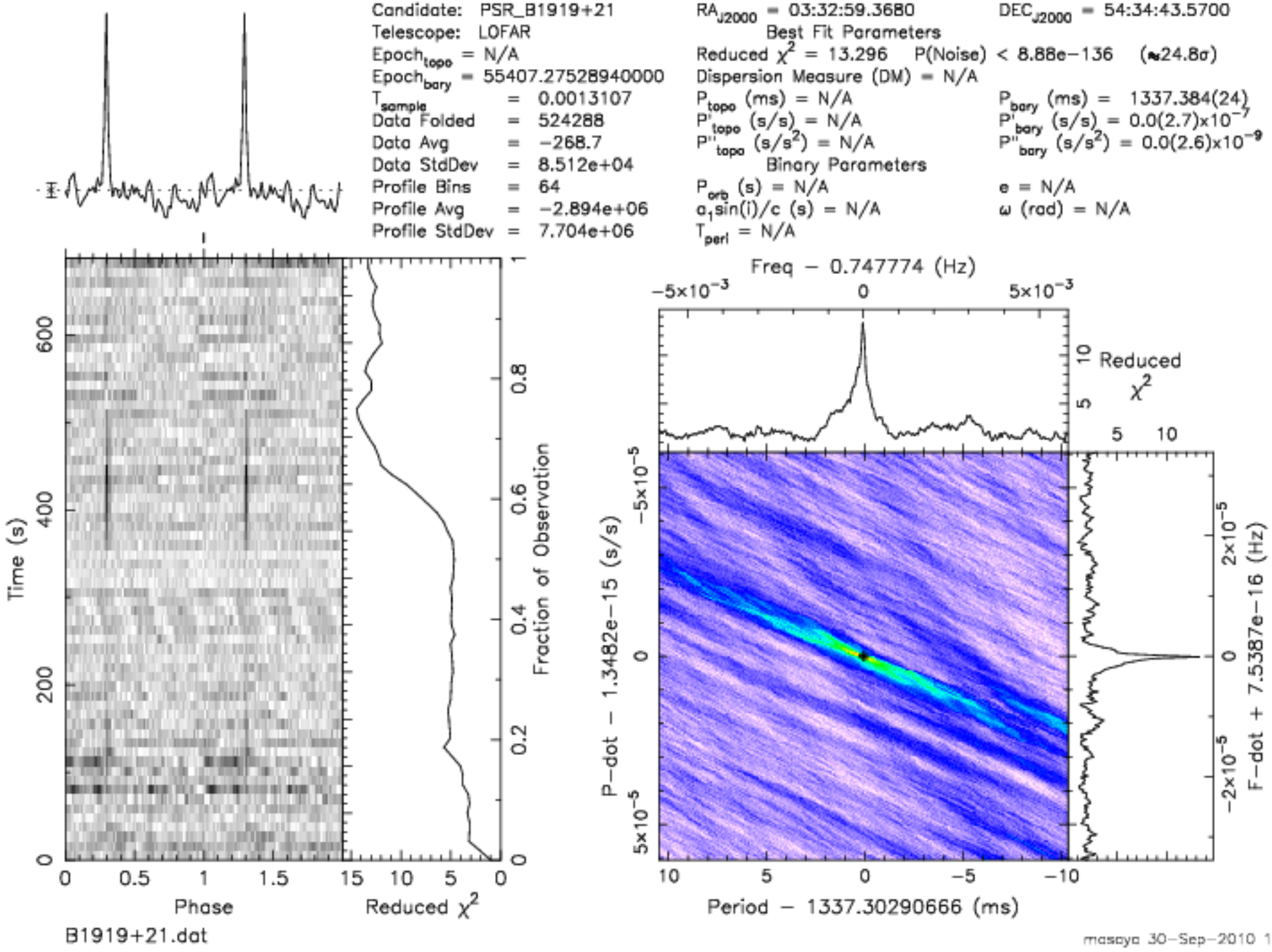
111.4 Mhz => **RM -63.7 rad/m^2**
(S. A. Suleĭmanova and V. D. Pugachev
Astronomy Reports Vol. 46, No. 1, 2002)



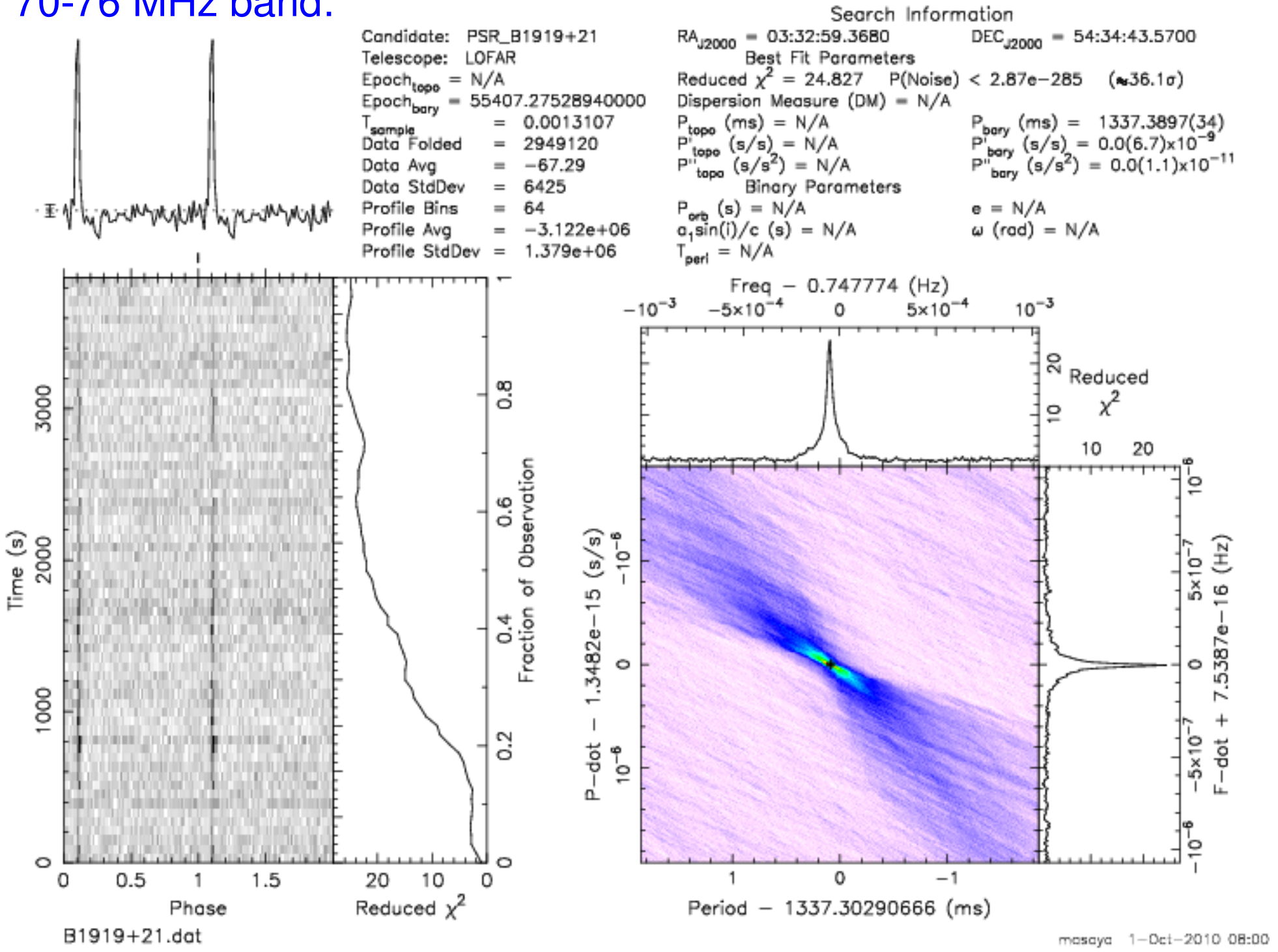


B1919+21 in low frequencies

60-66 MHz band:



70-76 MHz band:



Conclusions

- Pulsars have been observed

- Found rotation measures

- Errors reduced by intelligent data selection

- Solar observation possible (in principle)

- FUN!!! (but also frustration == sometimes pure noise)