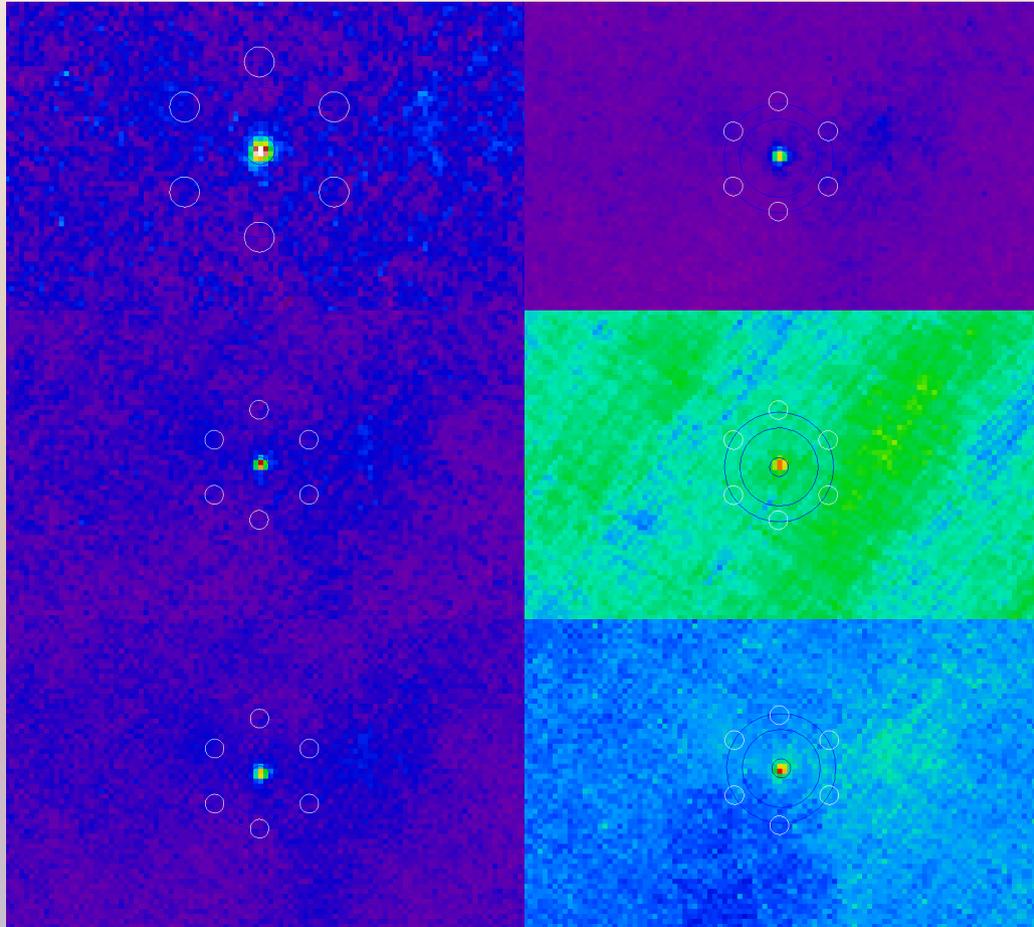


PACS Point Source Photometry



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Bruno Altieri (ESAC)
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Vera Konyves (CEA Saclay)

**it is still a
work in progress...**

Used data

- Real data
 - Rosette maps
 - 7 map makers in the red, 6 in the blue
 - ~ 100 point sources (Henneman et al. 2010)
- Simulations
 - Artificial point sources on simulated background
 - 6 map makers in the red, 6 in the blue
 - ~ artificial 180 point sources (2D-gaussian profile)

Mapmakers

- Real data

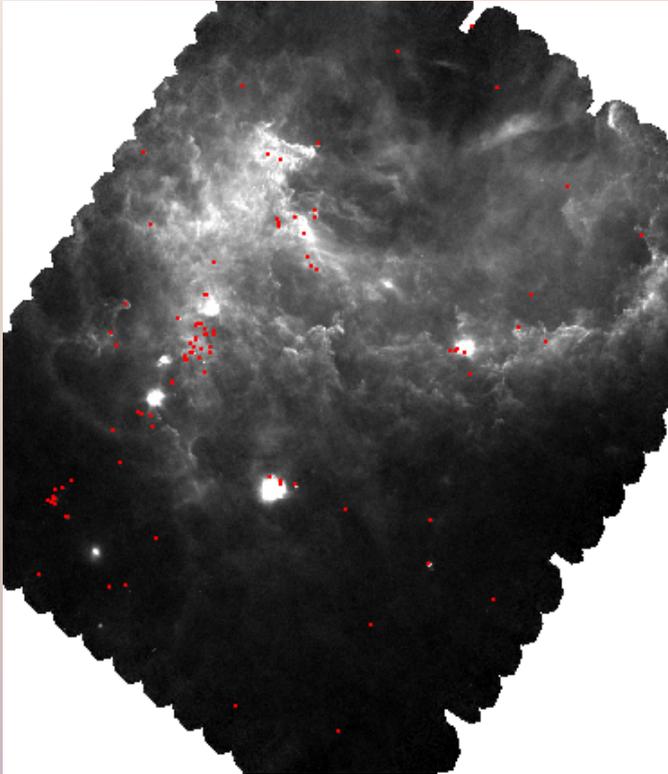
- Scanamorphos
- JPScanam
- Tamasis
- UNIMAP
- HPF+Photproject
- SANEPIC (red only)
- MADMap

- Simulations

- Scanamorphos
- JPScanam
- Tamasis
- UNIMAP
- HPF+Photproject
- MADMap

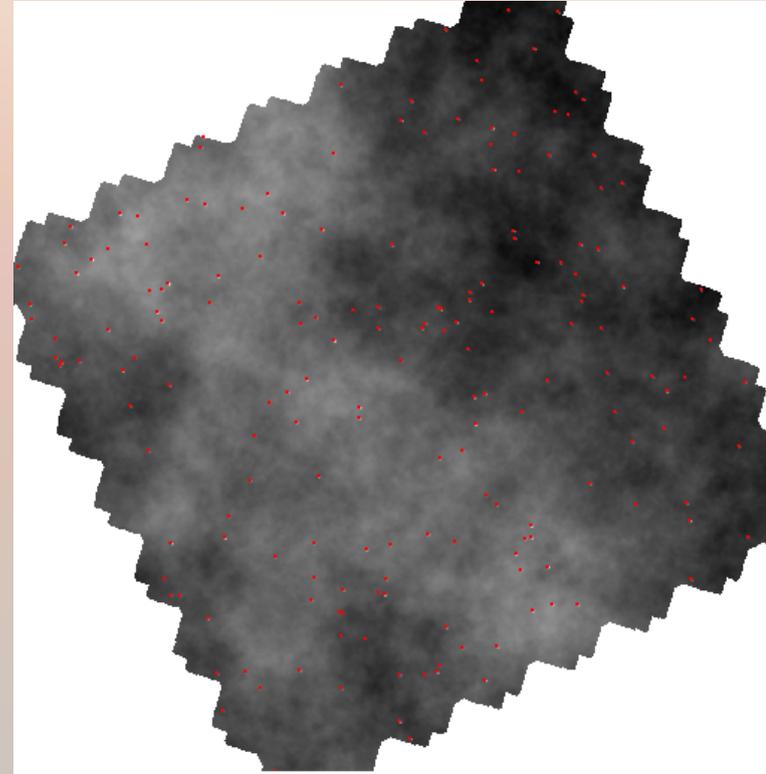
Sources

Real data



~100 sources ($F \sim 0.3 - 50$ Jy)
(Hennemann et al. 2010)

Simulated data



~ 180 sources ($F \sim 0 - 0.5$ Jy)

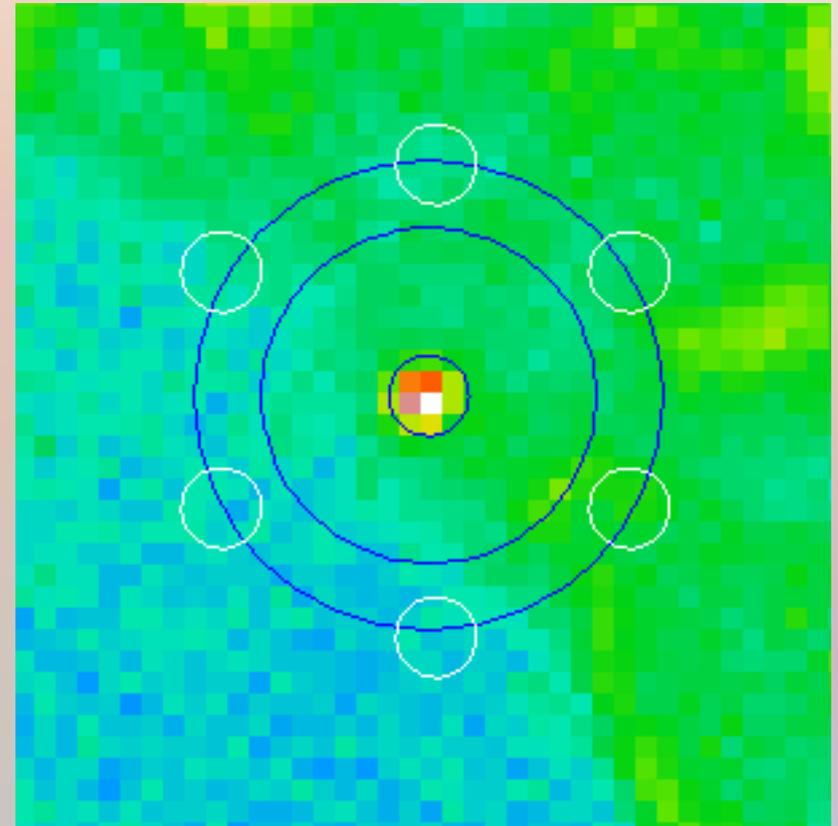
Photometry method

Real data:

- Aperture photometry
- HIPE 10 b2743
- **Re-centering during phot**
- **Two aperture size: 6" and 10"**
- Sky determination between 25"-35"
- Error determination using empty apertures around the source

Simulated data:

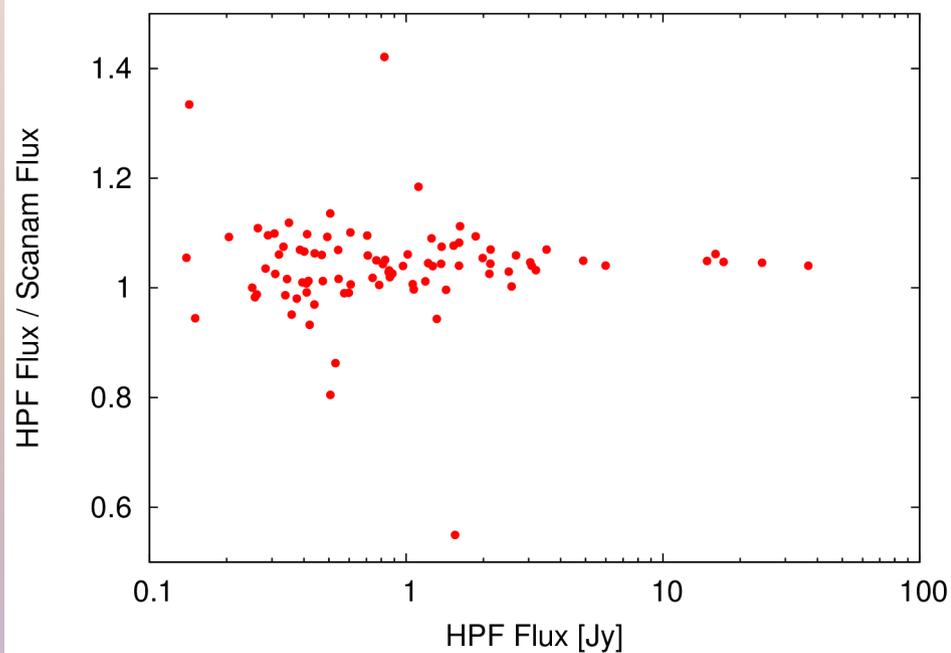
- Aperture photometry
- HIPE 10 b2743
- **No re-centering**
- **One aperture size: 10"**
- Sky determination between 25"-35"
- Error determination using empty apertures around the source



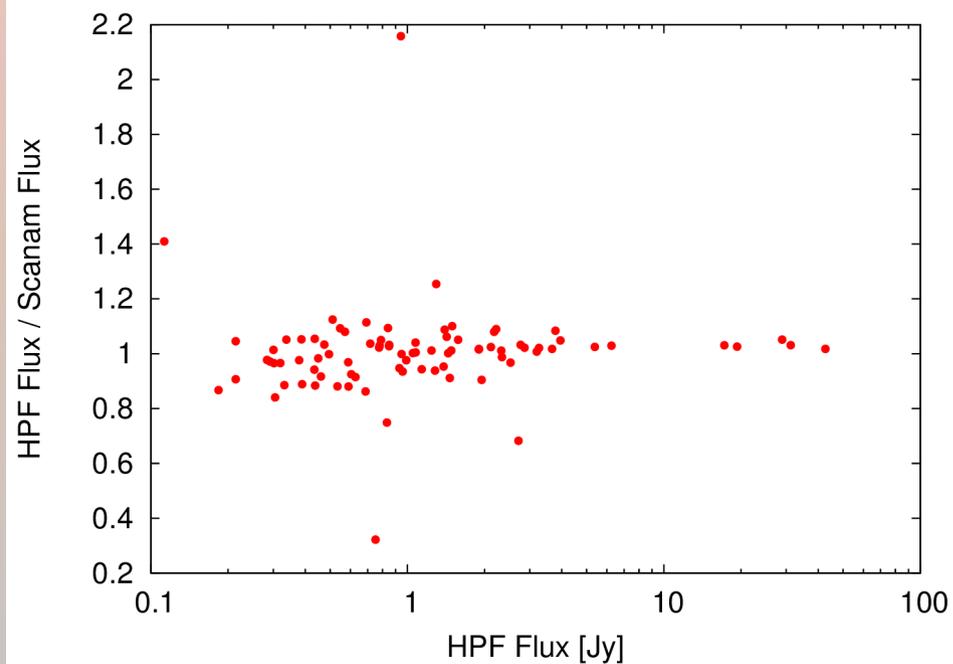
Results: real sources

Example: Scanamorpos – HPF comparison
Blue channel

R=6"



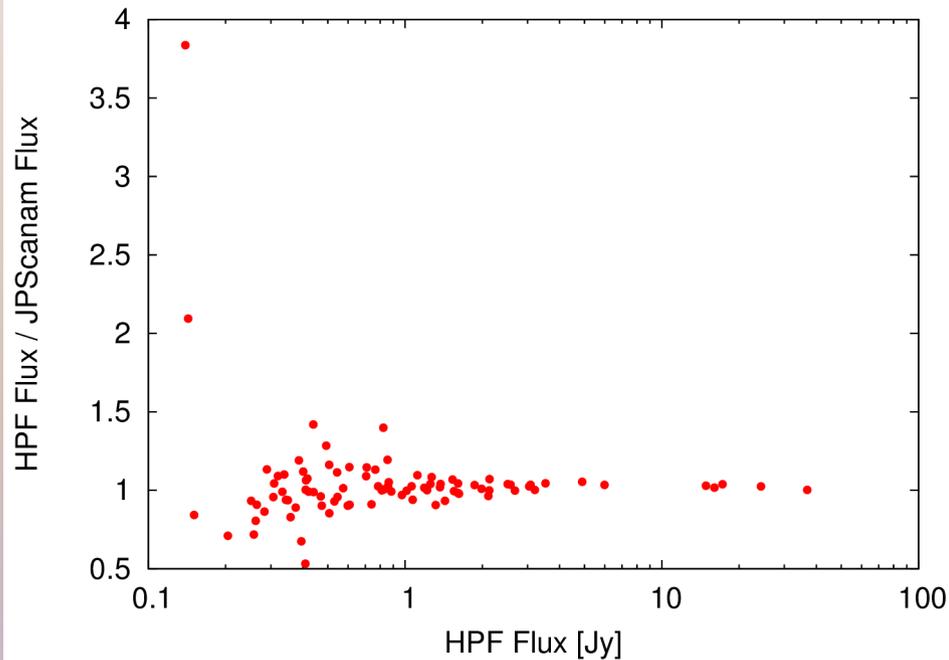
R=10"



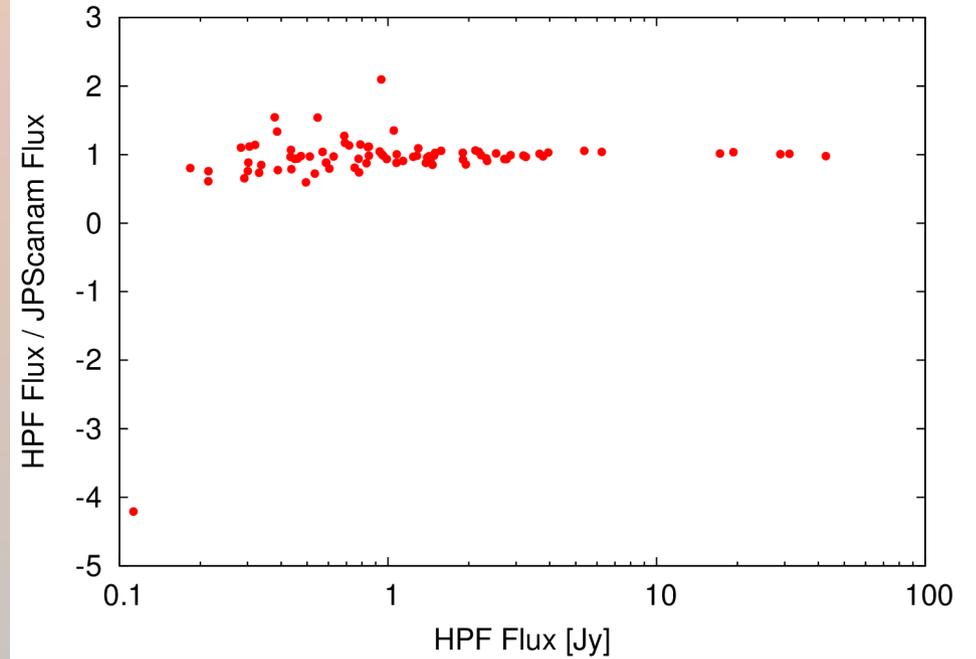
Results: real sources

Example: JPScanam – HPF comparison
Blue channel:

R=6"



R=10"



Results: real sources

Blue channel

R=10"	Scanam	JPScan	Unimap	Tamasis	SANEPIC	MADMap
ratio	1.01(1.00)	0.93(0.96)	1.00(1.00)	1.01(1.00)	-	1.00(0.99)
sigma	0.17(0.09)	0.60(0.14)	0.16(0.09)	0.12(0.10)	-	0.14(0.10)

R=6"	Scanam	JPScan	Unimap	Tamasis	SANEPIC	MADMap
ratio	1.04(1.04)	1.05(1.00)	1.01(1.04)	1.01(0.97)	-	1.01(1.03)
sigma	0.09(0.09)	0.34(0.13)	0.13(0.06)	0.07(0.07)	-	0.12(0.06)

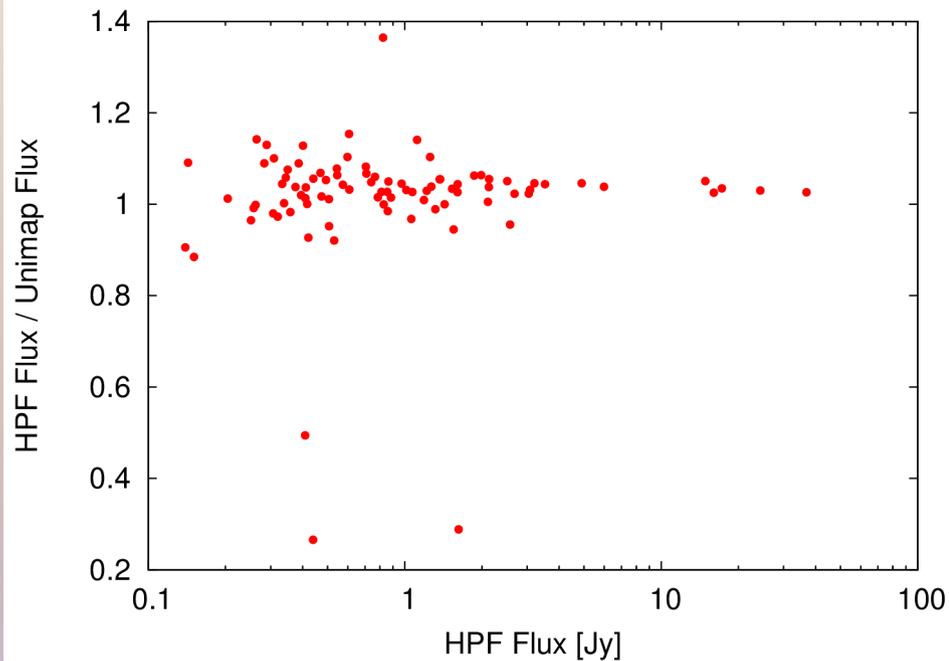
There is a difference between the results obtained using the two different apertures

It suggests changes in the shape of the PSF.

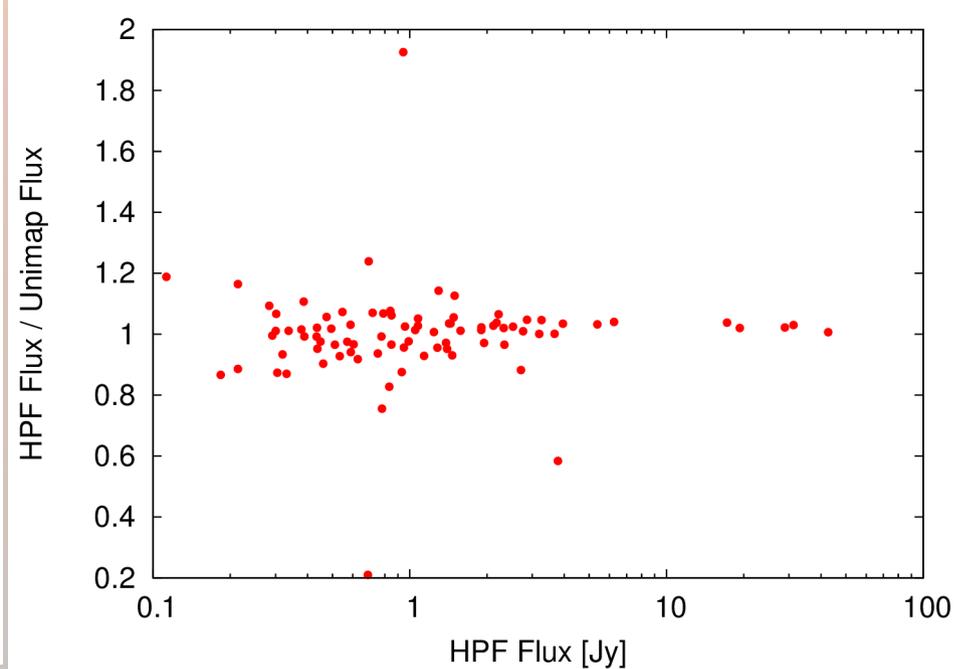
Results: real sources

Example: UNIMAP – HPF comparison
Blue channel

R=6"

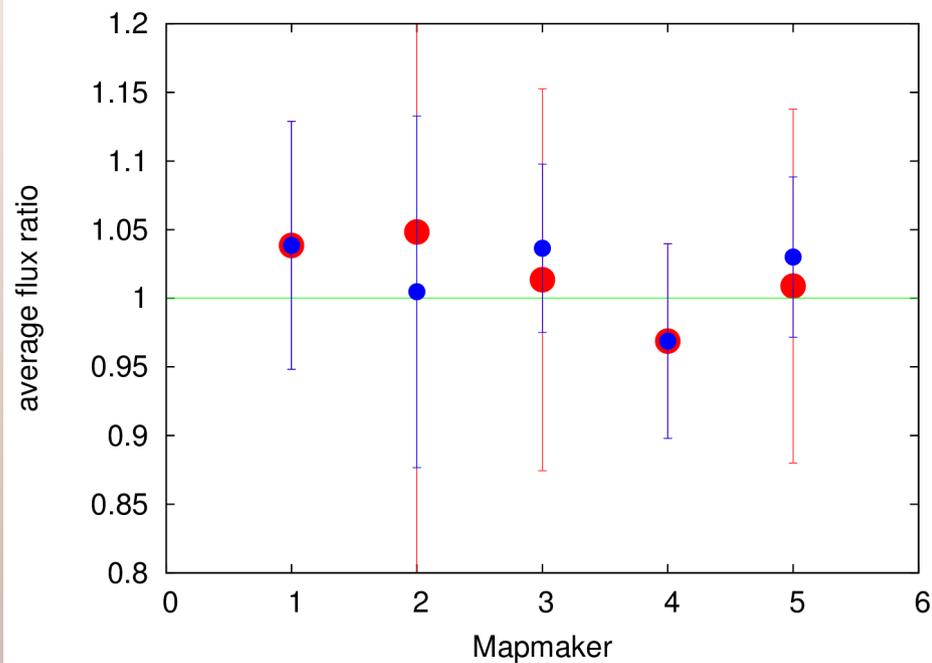


R=10"

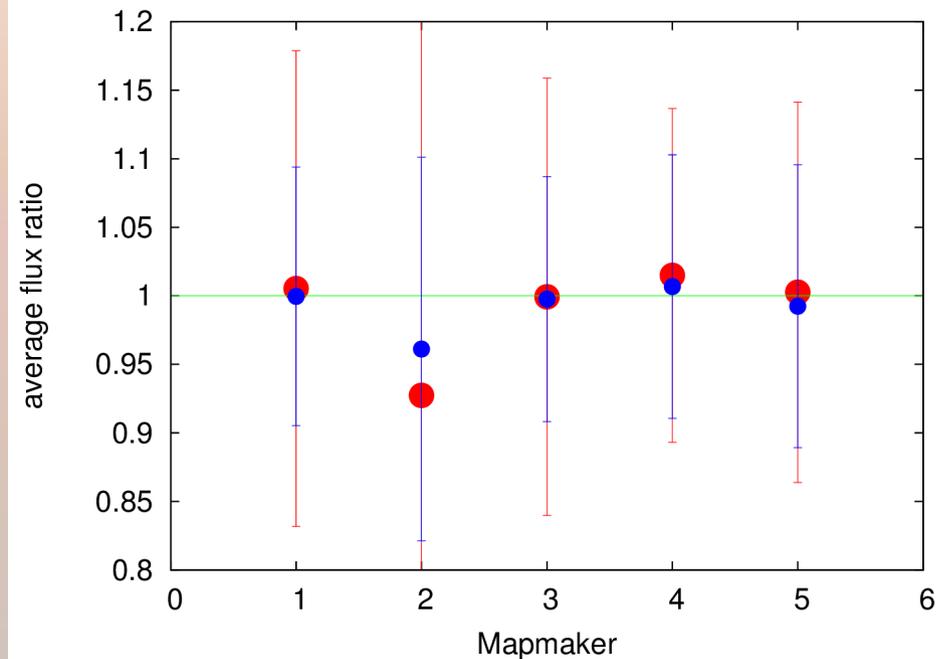


Results: real sources

R=6''



R=10''



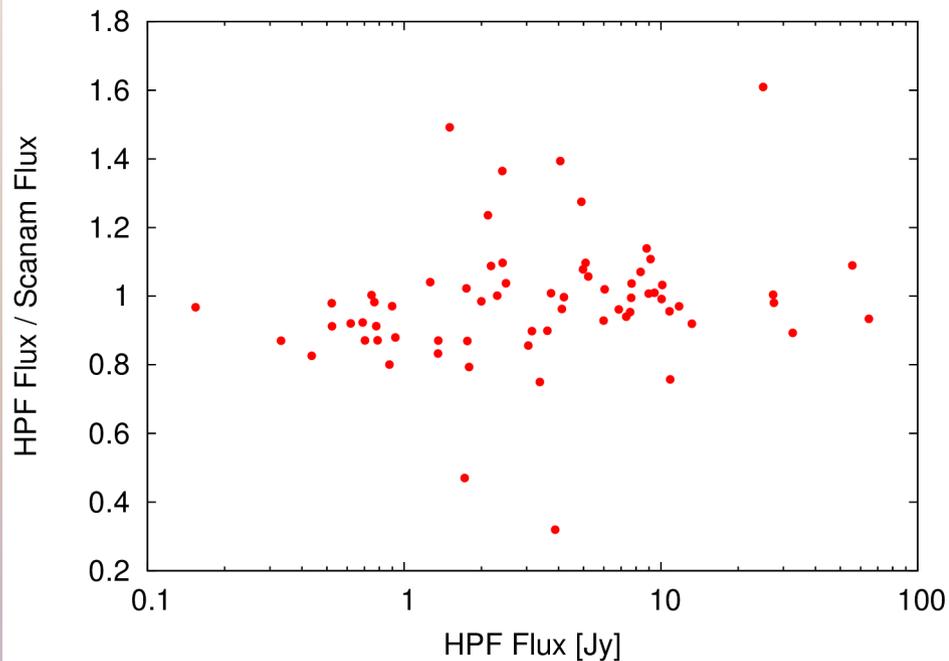
Mapmakers:

- 1) Scanammorphos
- 2) JPScanam
- 3) Unimap
- 4) Tamasis
- 5) MADMap

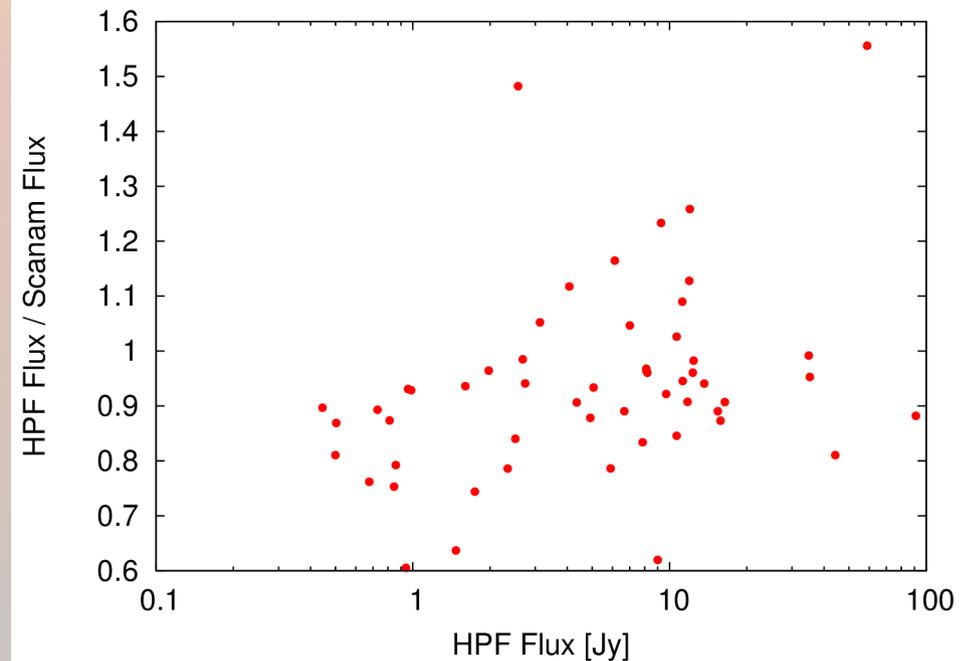
Results: real sources

Example: Scanamorpos – HPF comparison
Red channel:

R=12''



R=20''



The two distributions are completely different...

Results: real sources

Red channel

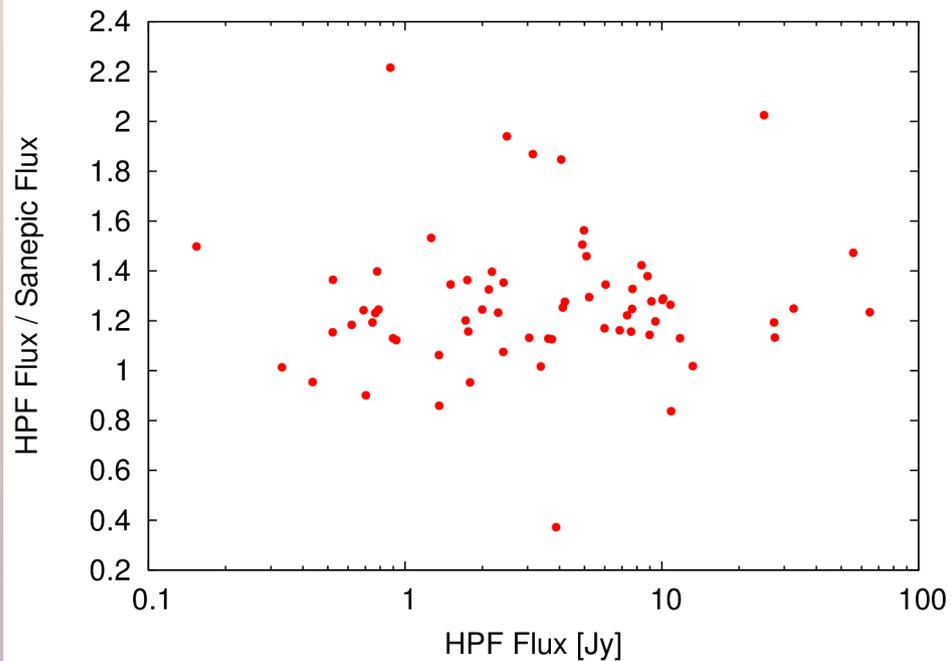
R=20";red	Scanam	JPScan	Unimap	Tamasis	SANEPIC	MADMap
ratio	0.92(0.93)	1.00(1.00)	0.92(0.94)	1.02(1.01)	1.16(1.13)	0.92(0.91)
sigma	0.23(0.15)	0.27(0.19)	0.23(0.15)	0.23(0.16)	0.30(0.17)	0.23(0.16)

R=12";red	Scanam	JPScan	Unimap	Tamasis	SANEPIC	MADMap
ratio	0.98(0.99)	1.06(1.04)	0.96(0.96)	1.04(1.03)	1.26(1.21)	0.97(0.97)
sigma	0.19(0.14)	0.22(0.16)	0.20(0.14)	0.20(0.16)	0.28(0.15)	0.20(0.14)

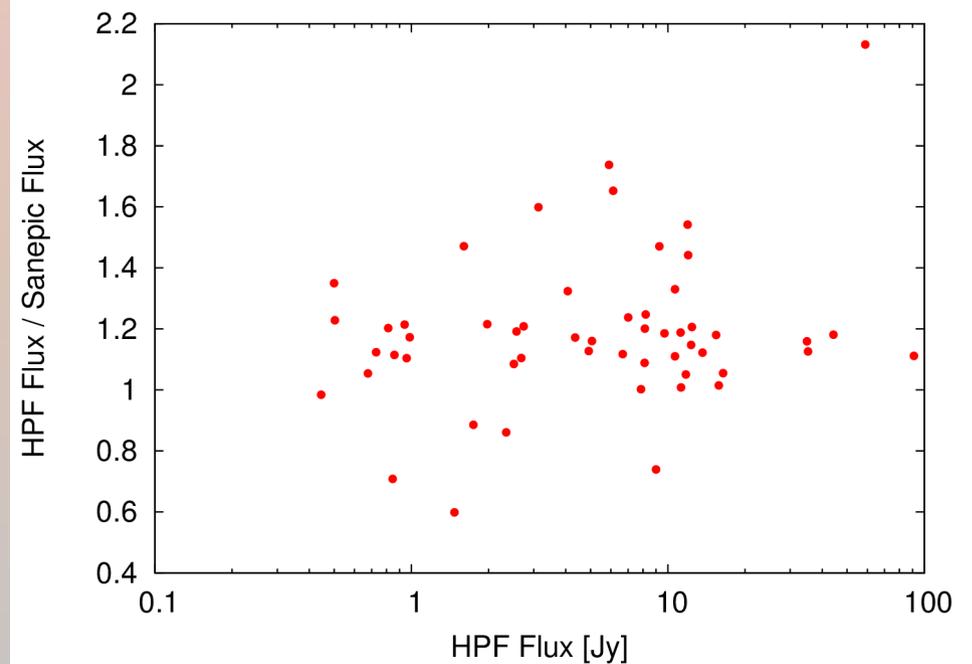
Results: real sources

Example: SANEPIC – HPF comparison
red channel

R=12''

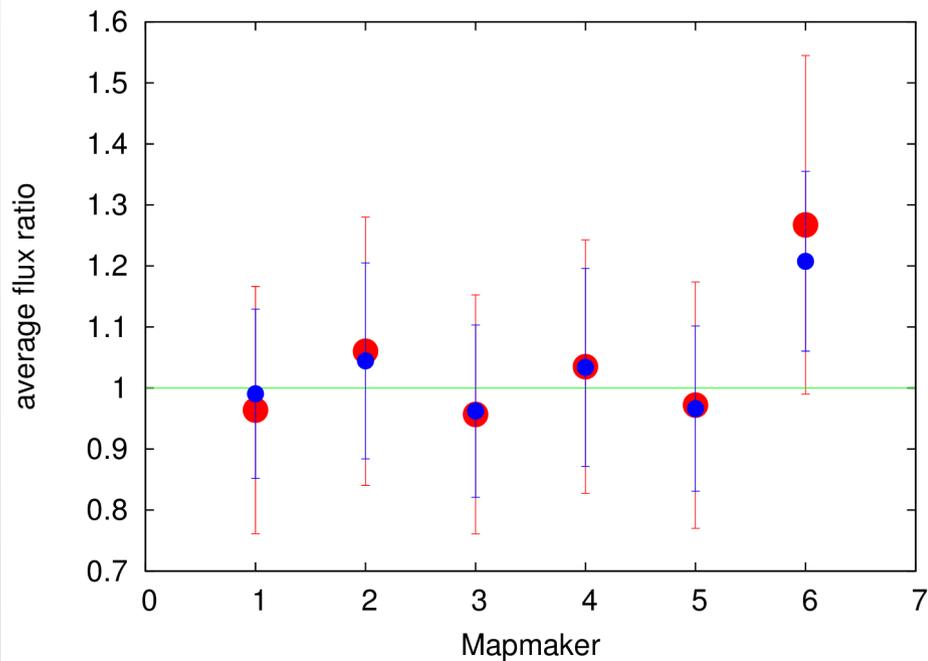


R=20''

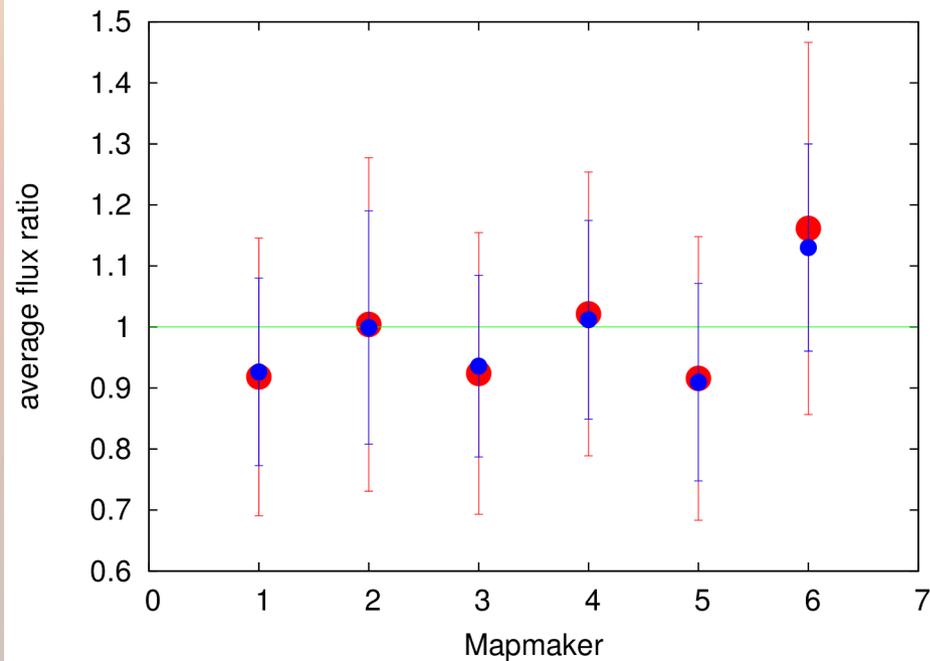


Results: real sources

R=12''



R=20''



Mapmakers:

- 1) Scanammorphos
- 2) JPScanam
- 3) Unimap
- 4) Tamasis
- 5) MADMap
- 6) SANEPIC

Results: simulations

Blue channel Faint background

r=10"	Scanam	JPScan	Unimap	Tamasis	HPF	MADMap
ratio	0.995	1.001	0.907	1.001	0.997	0.968
sigma	0.213	0.275	0.172	0.200	0.164	0.194

Red channel Faint background

r=20"	Scanam	JPScan	Unimap	Tamasis	HPF	MADMap
ratio	1.407	1.283	1.238	1.184	1.134	1.271
sigma	0.683	1.106	0.611	0.588	0.492	0.675

Results: simulations

Blue channel Bright background

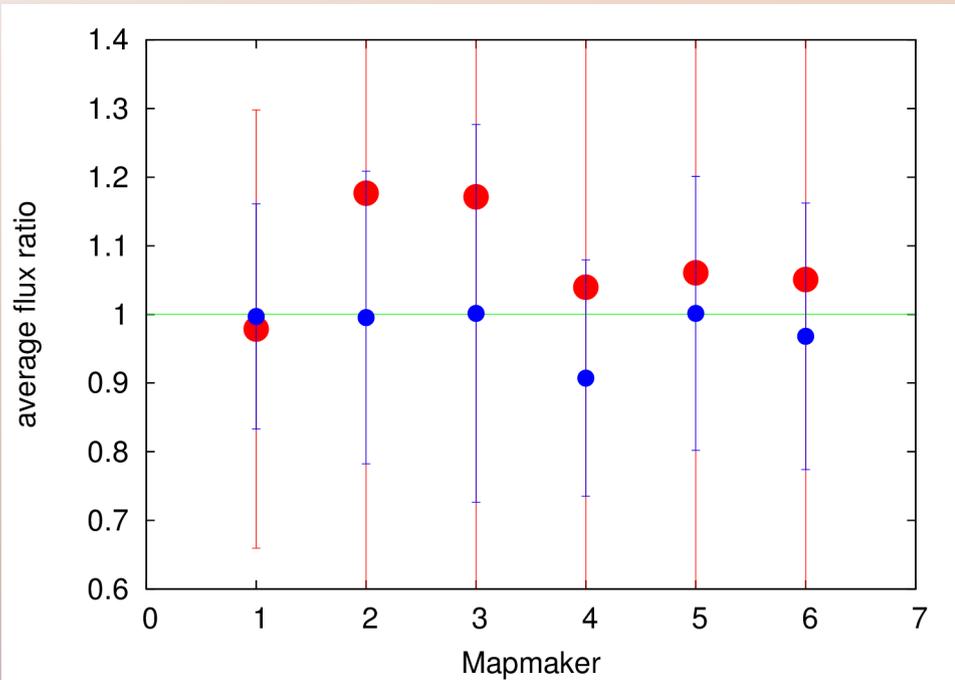
r=10"	Scanam	JPScan	Unimap	Tamasis	HPF	MADMap
ratio	1.177	1.171	1.040	1.061	0.979	1.051
sigma	0.635	0.658	0.529	0.521	0.320	0.495

Red channel Bright background

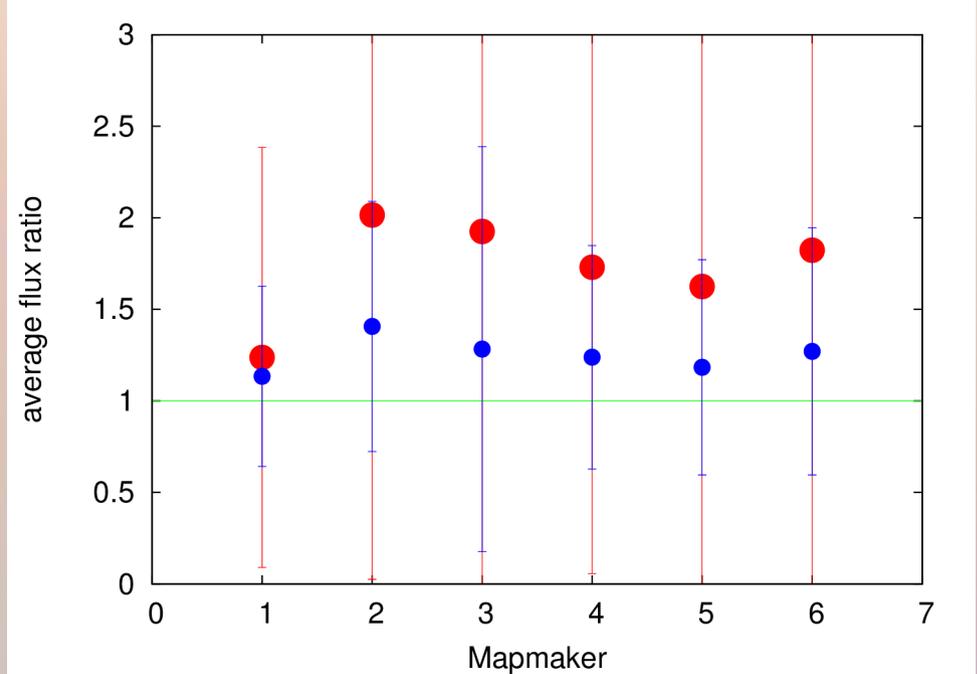
r=20"	Scanam	JPScan	Unimap	Tamasis	HPF	MADMap
ratio	2.015	1.925	1.730	1.625	1.237	1.823
sigma	2.000	2.473	1.674	1.749	1.147	1.980

Results: simulations

blue



red



Mapmakers:

- 1) HPF
- 2) Scanammorphos
- 3) JPScanam
- 4) Unimap
- 5) Tamasis
- 6) MADMap

Conclusions

- **Real data**

- All map makers doing almost equally well
- JPScanam stands out a few percent
- SANEPIC stands out quite a bit in the red (no blue map available)
- In some cases there is a difference between photometry using smaller and larger apertures suggesting PSF shape changes

- **Simulated data**

- sources are too faint wrp to background so the maps are not really suitable for photometric comparison
- Still 4 out of 6 mapmakers produce good results on faint background on the blue side
- Only HPF produced acceptable results on the simulated maps with bright background
- From the results on the red side it is impossible to draw any conclusion