EPIC 2.0: a second youth for XMM-Newton's workhorse

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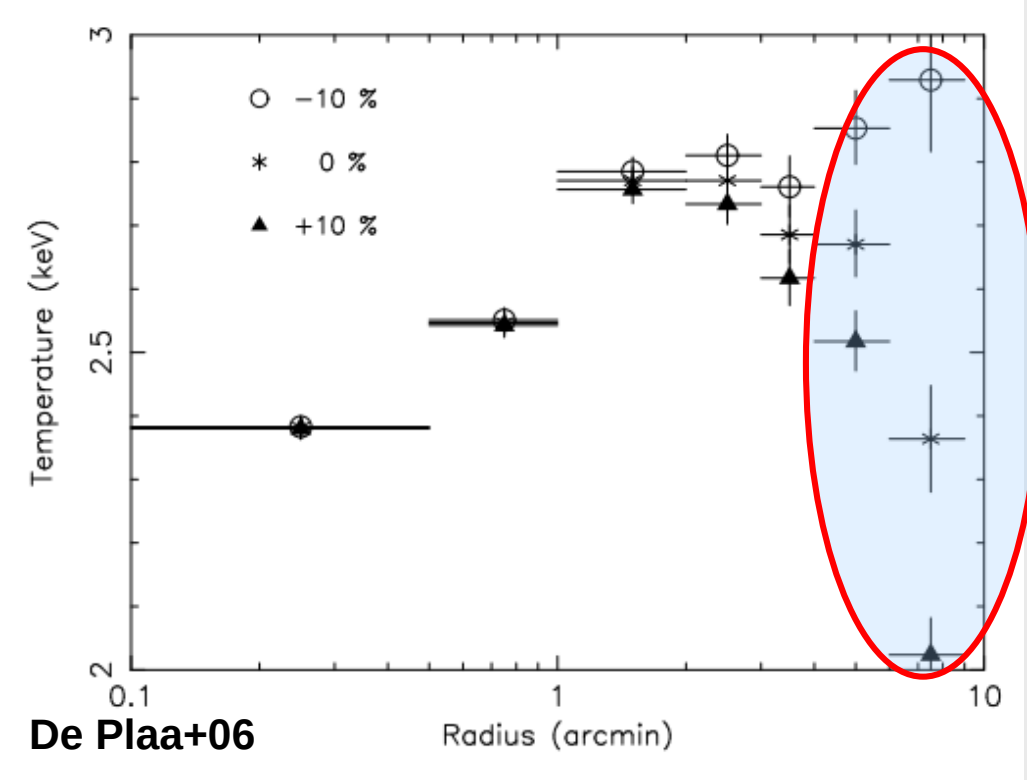
Statistics vs Systematics



De Plaa+06

Systematics is the major issue

Reduce systematics → More science

EPIC 2.0

To reduce systematic errors must achieve a deeper understanding of instrumental bkg
Analysis of full EPIC archive

Significant resources required

EXTraS (Exploring the X-ray Transient and variable Sky)

A project within the EU-FP7 framework

Arembes (ATHENA Radiation Environment Models and X-Ray Background Effects Simulators)
R&D Activity within ATHENA

Work in progress
For the time being analysis of MOS2

Collaborators

A.De Luca, S.De Grandi,D.Eckert
F.Gastaldello, S.Ghizzardi, M.Marelli,
S.Mereghetti, A.Moretti, N.La Palombara,
M.Rossetti, D.Salvetti, A.Tiengo

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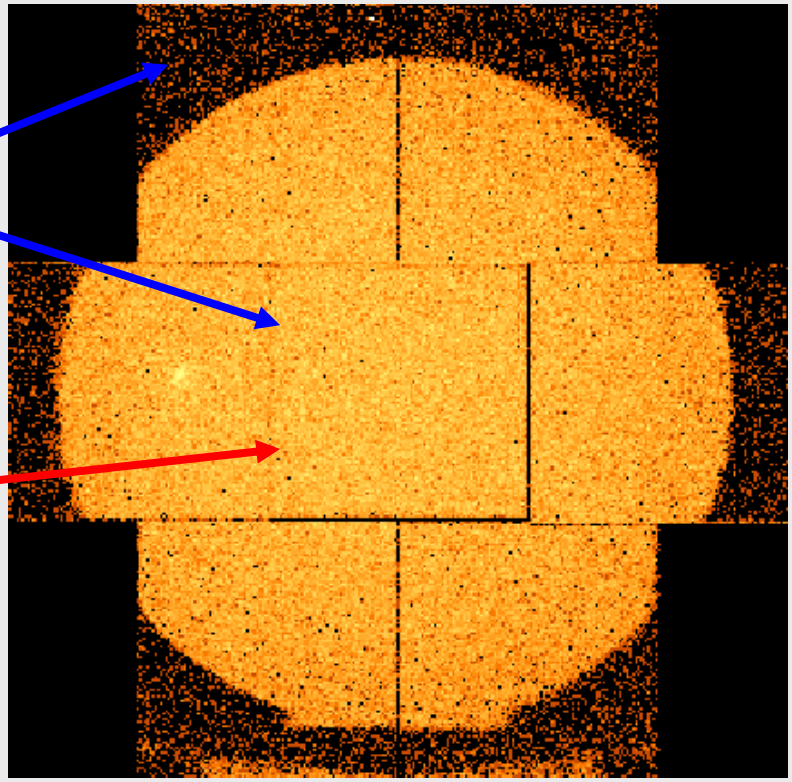
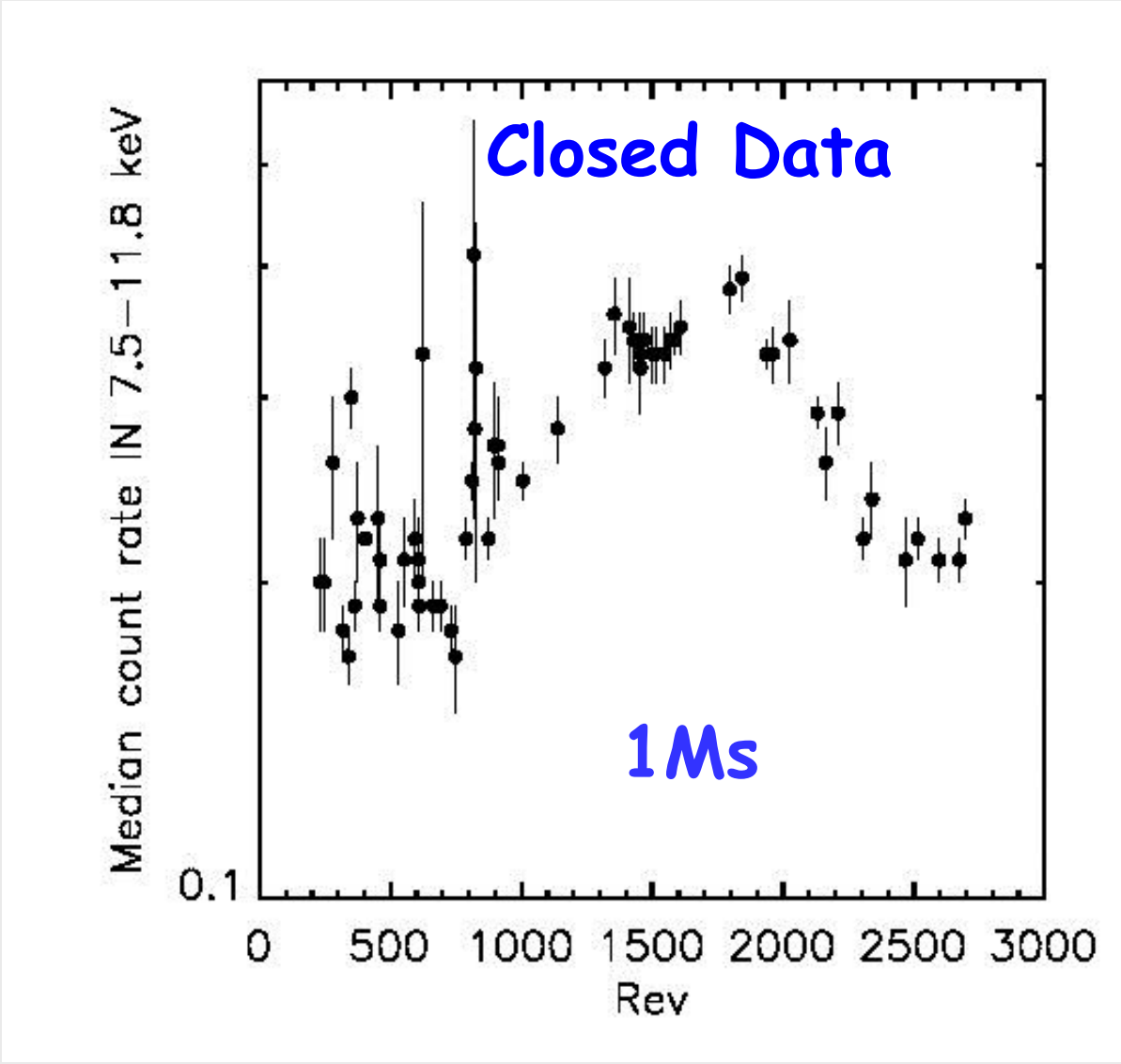
Instrumental bkg

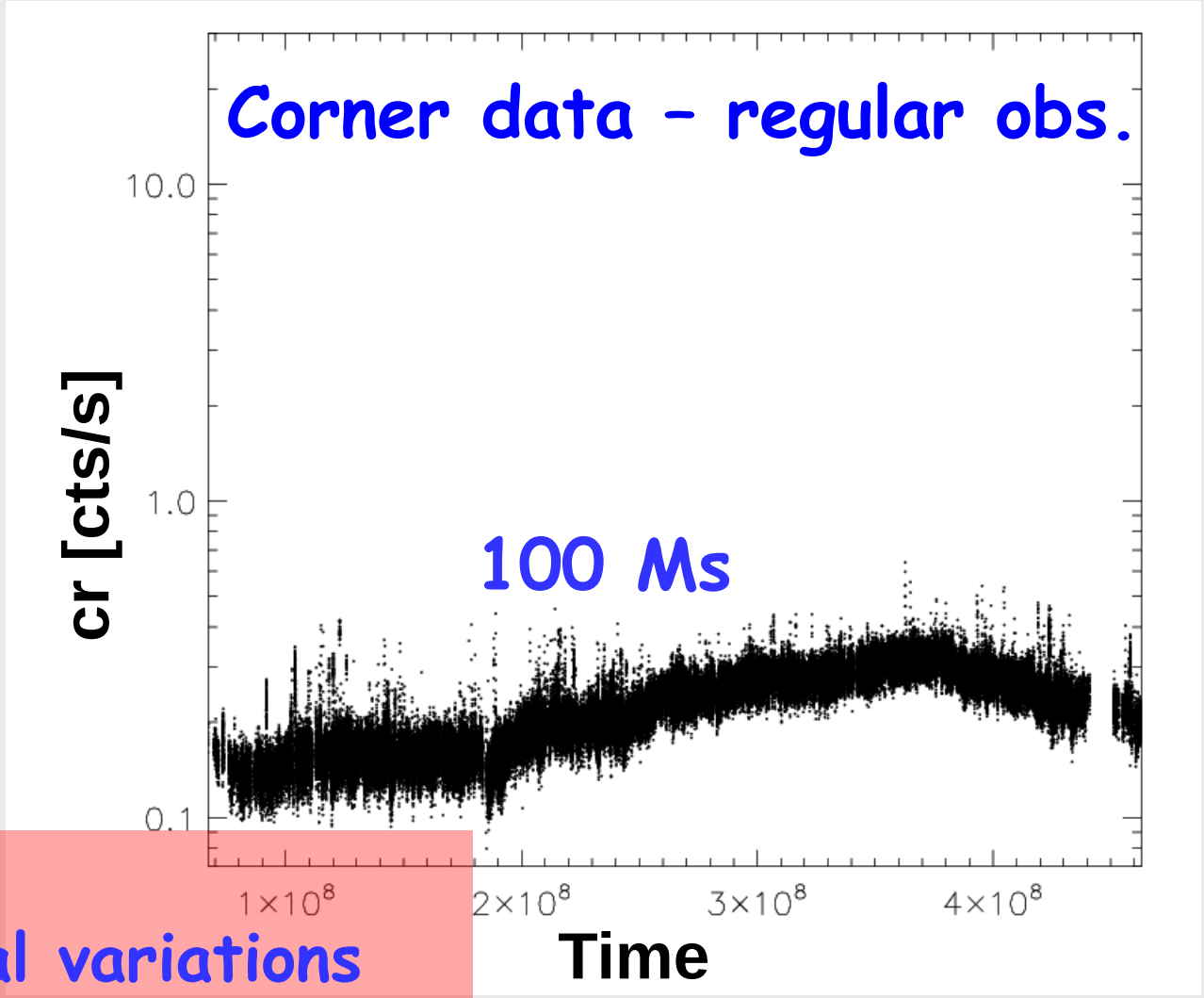
- Secondaries generated by high energy particle (E>100 MeV) mostly Cosmic Rays p+
- Low energy ions (E<100 KeV) concentrated by mirrors



High Energy induced bkg

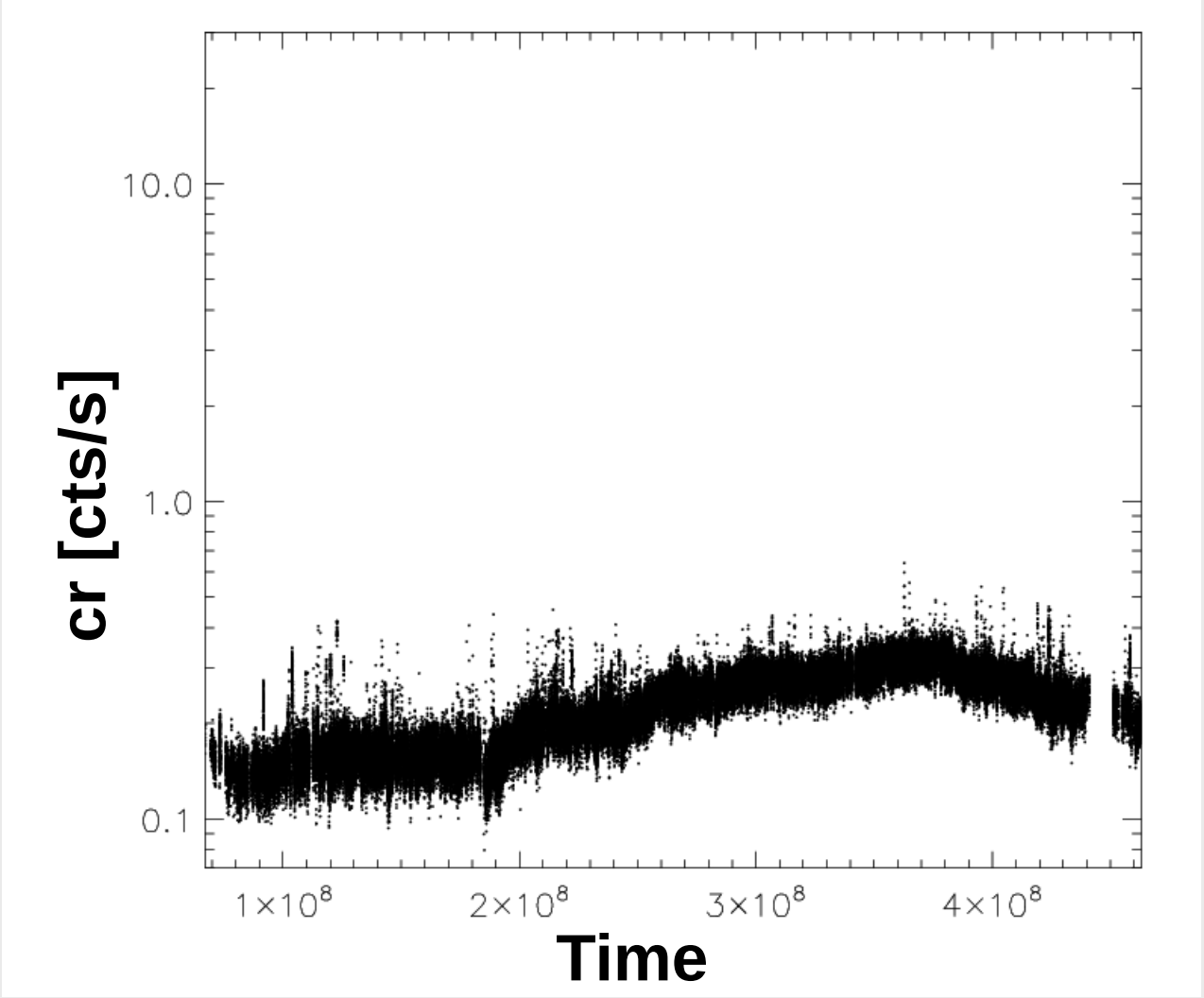


High Energy induced bkg



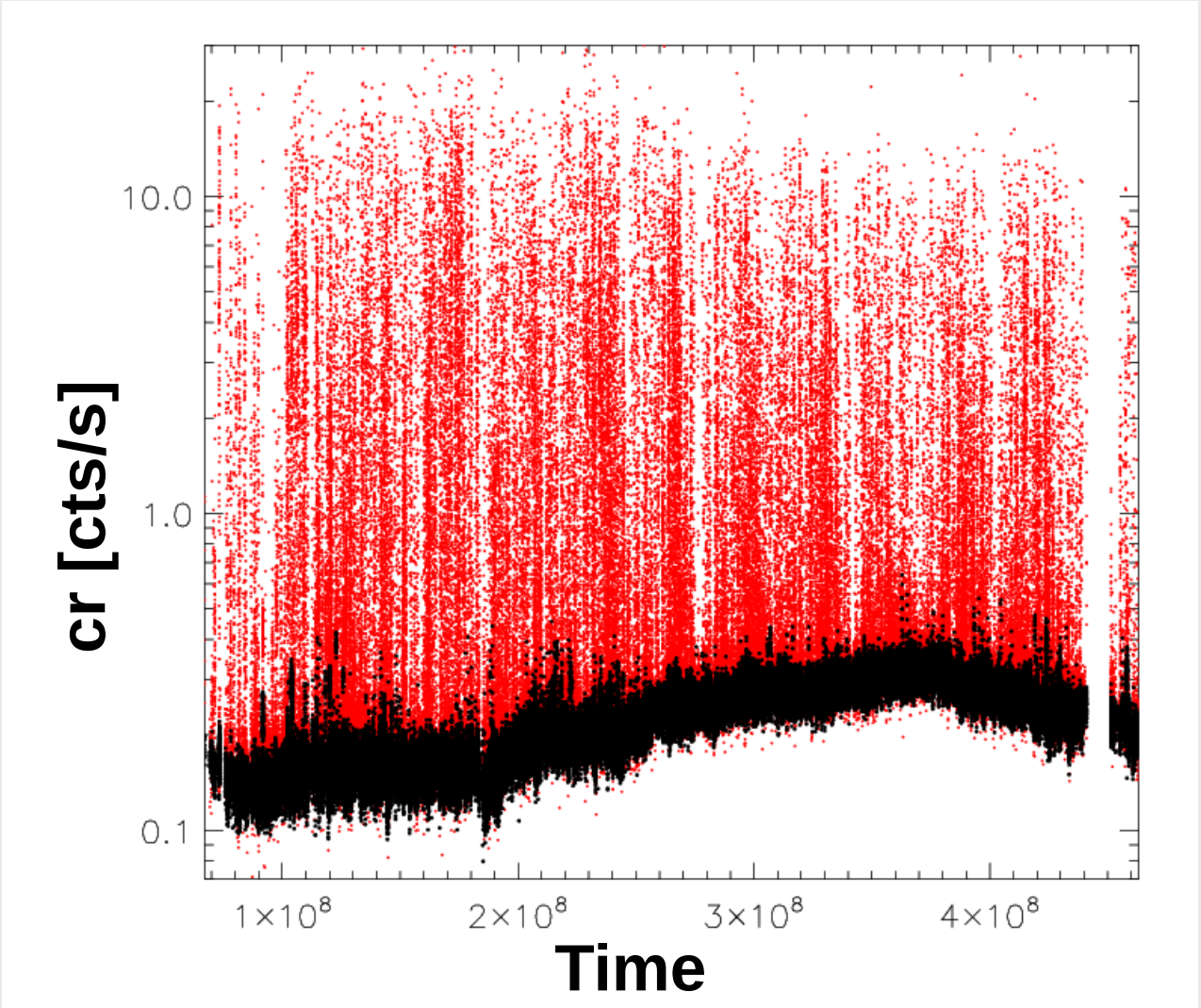
- Slowly varying
- Modest spectral variations
- High reproducibility (few %)

High Energy induced bkg

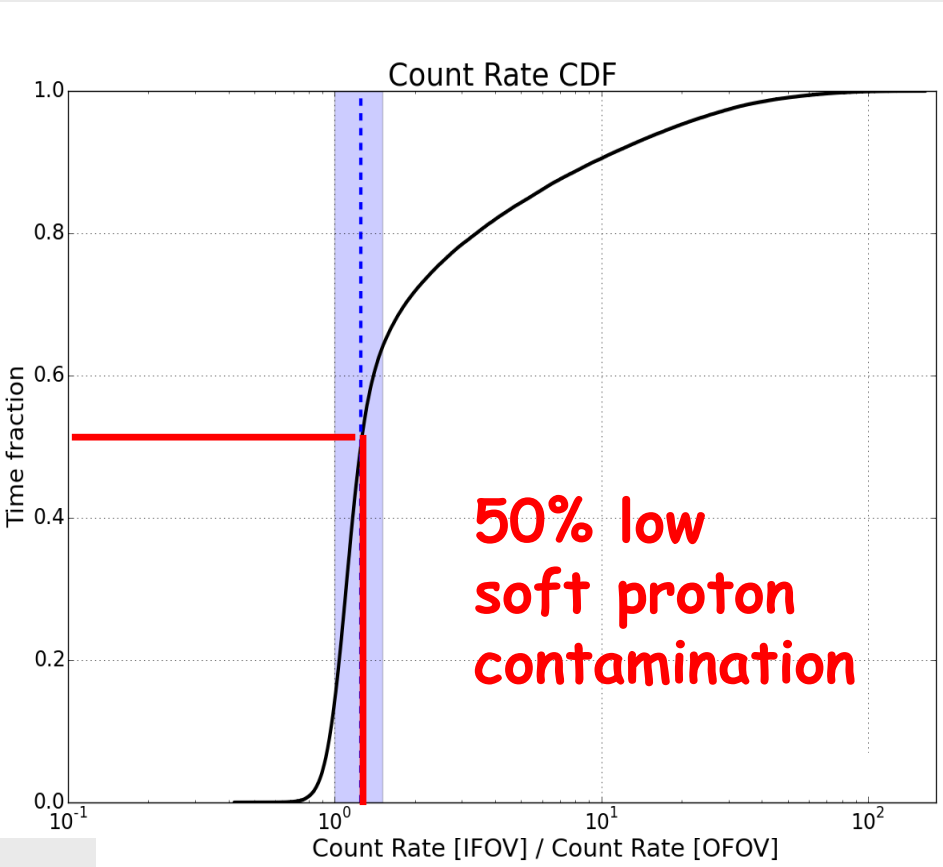


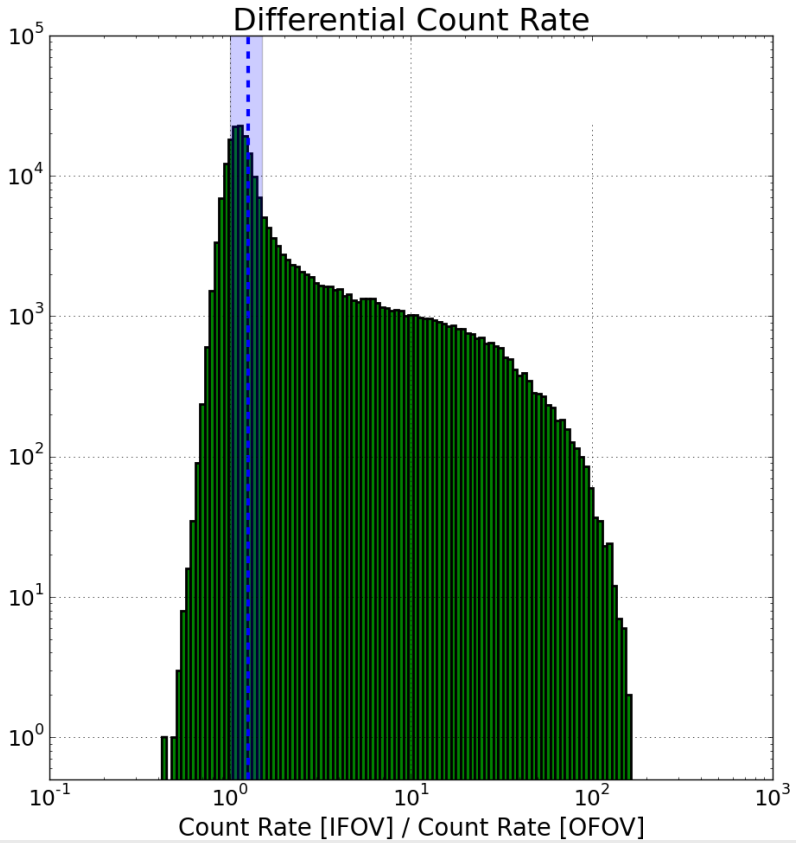
High Energy induced bkg

Soft protons highly variablie

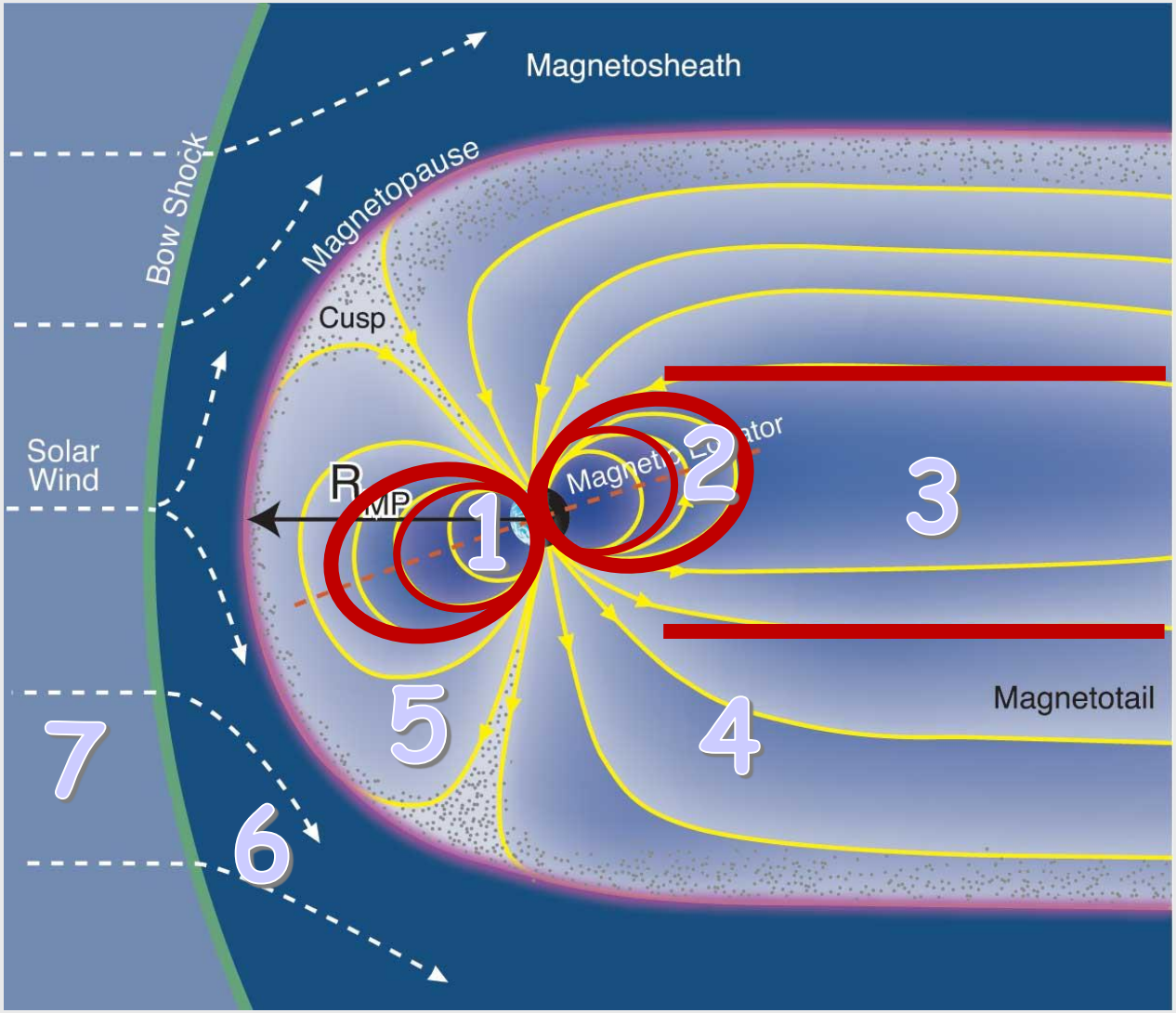


Cumulative & Differential in/out ratio distribution



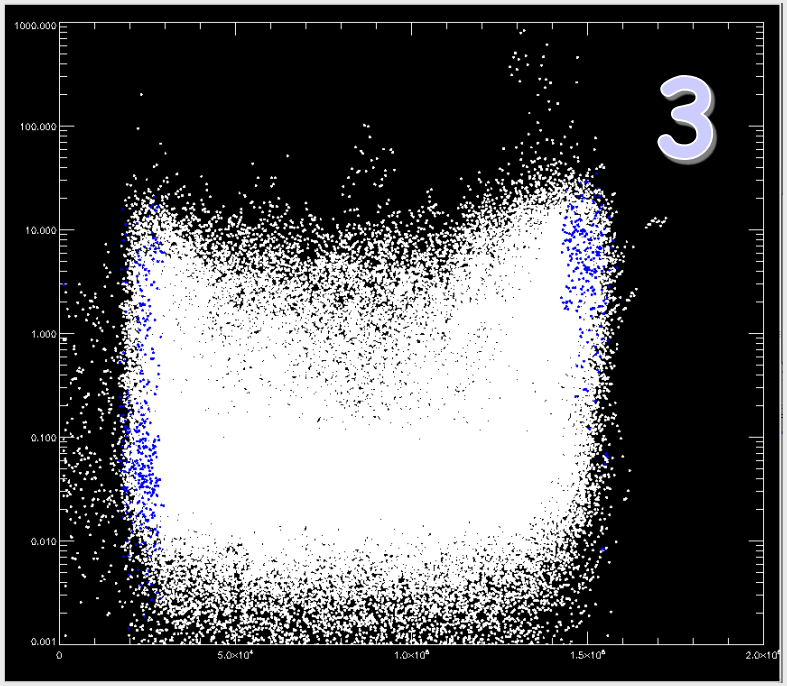


The Enivronment

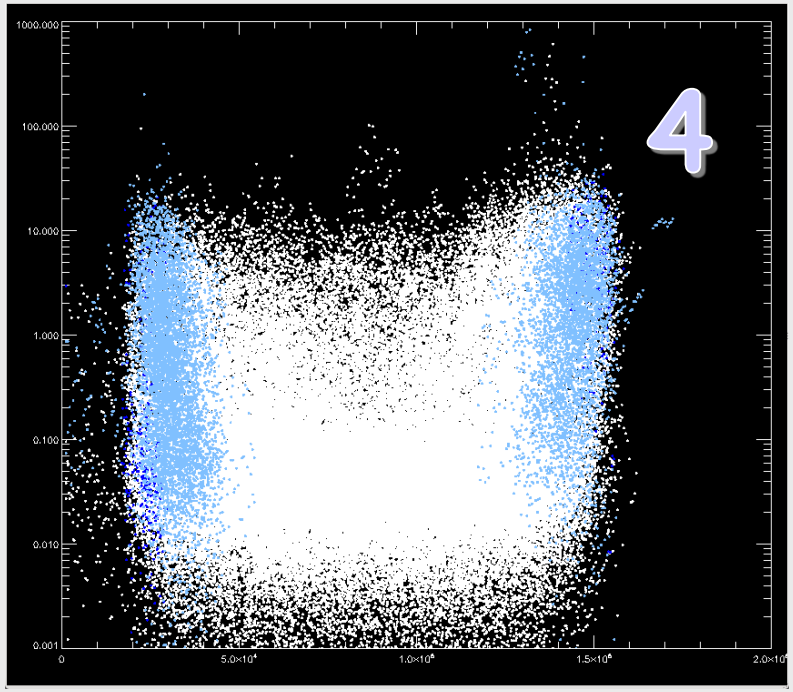


Soft Protons vs Environment

cr [cts/s]

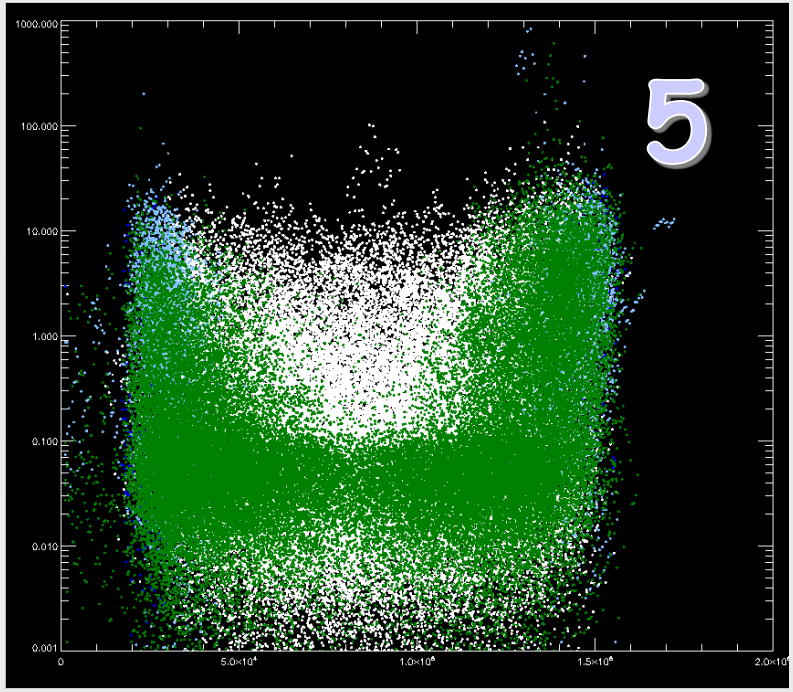


Orbit Time



Orbit Time

Soft Protons vs Environment



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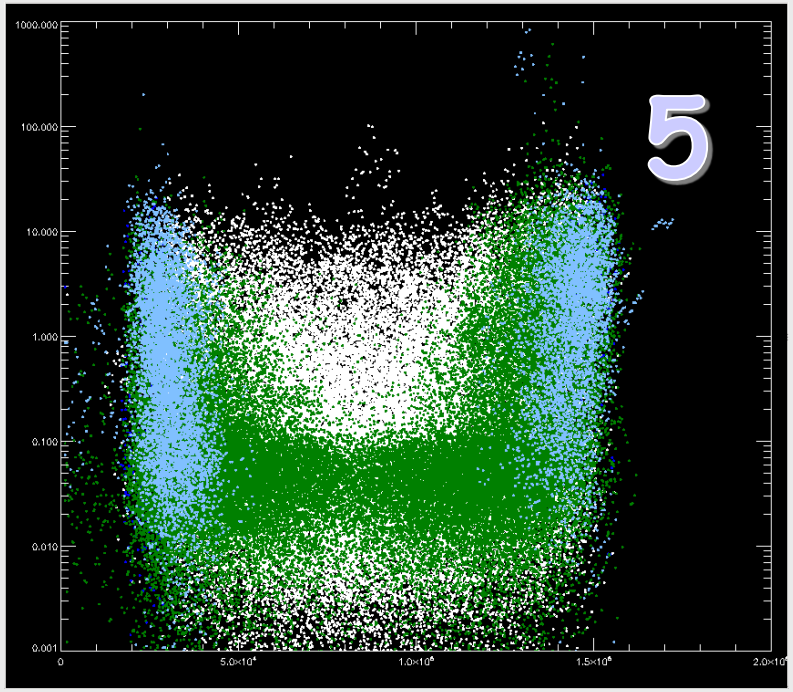
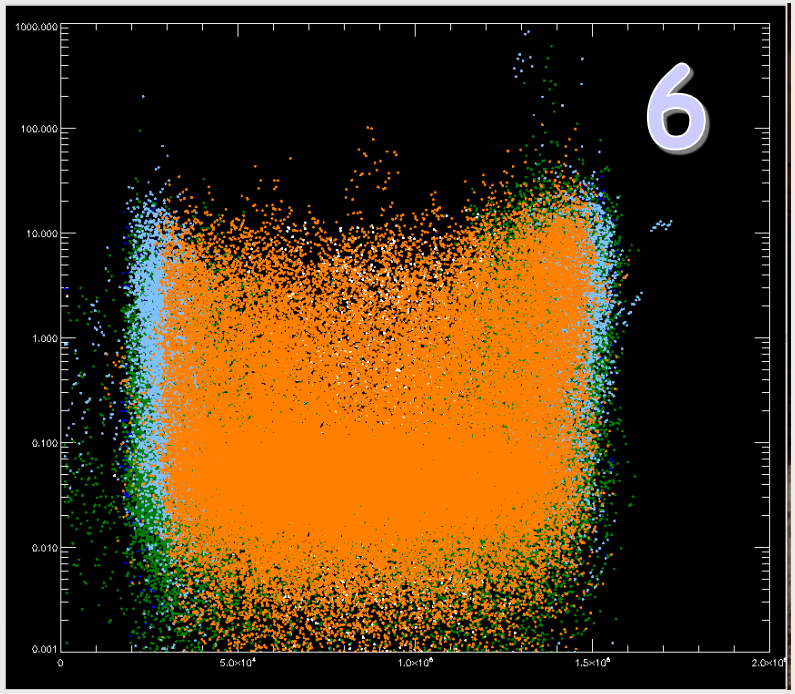
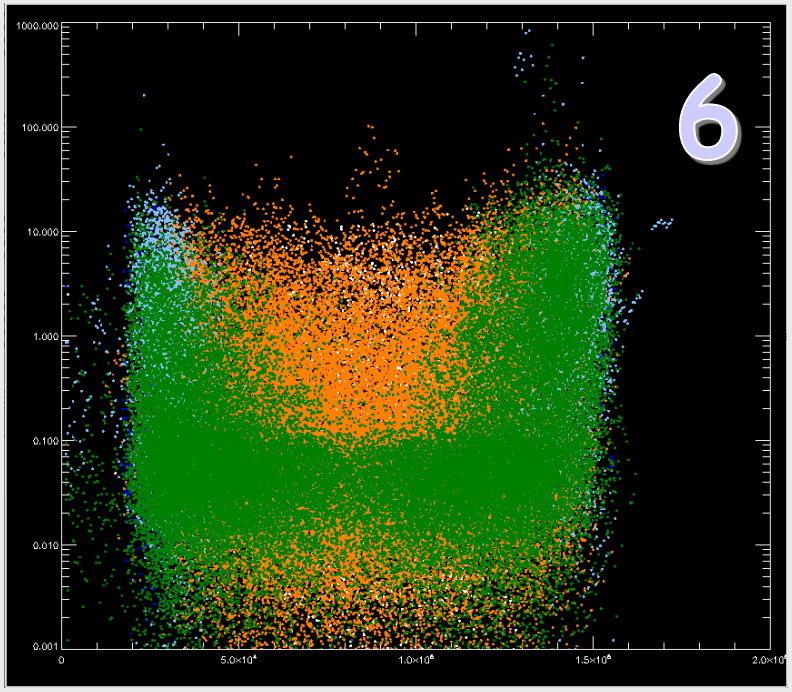


Orbit Time

Soft Protons vs Environment

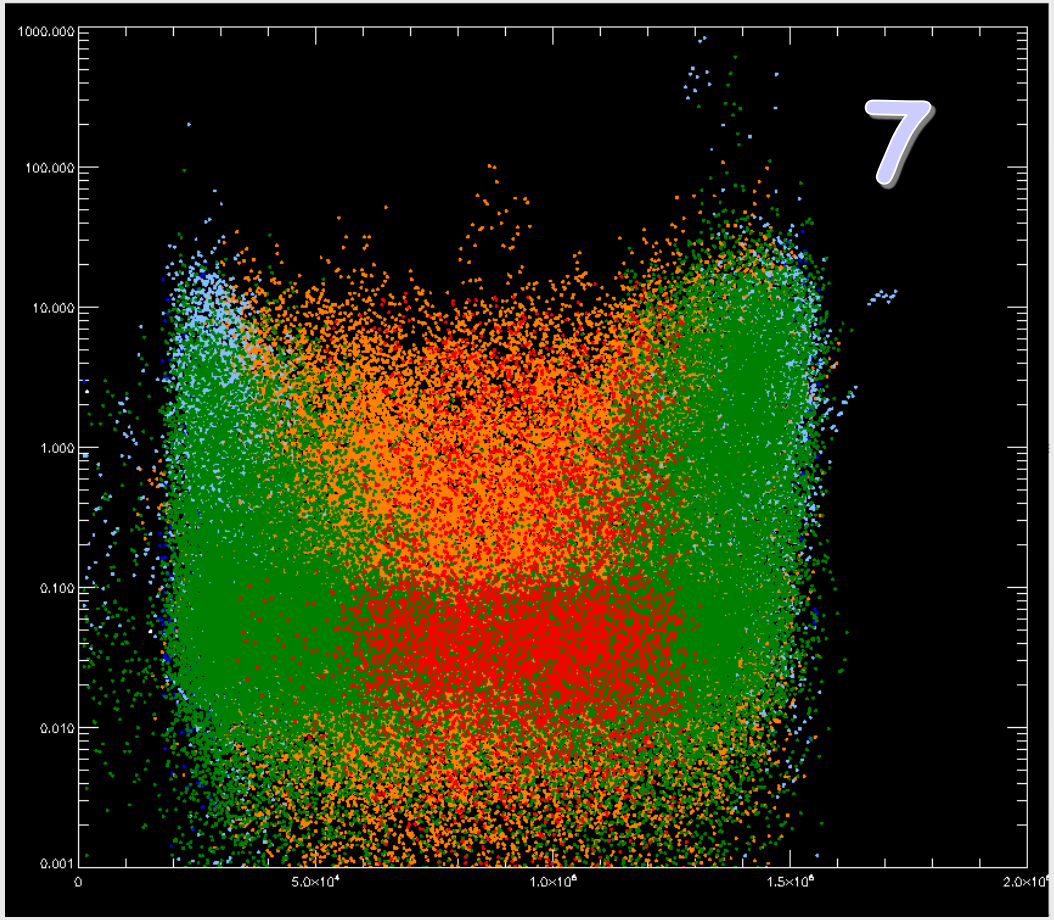


Orbit Time



Orbit Time

Soft Protons vs Environment

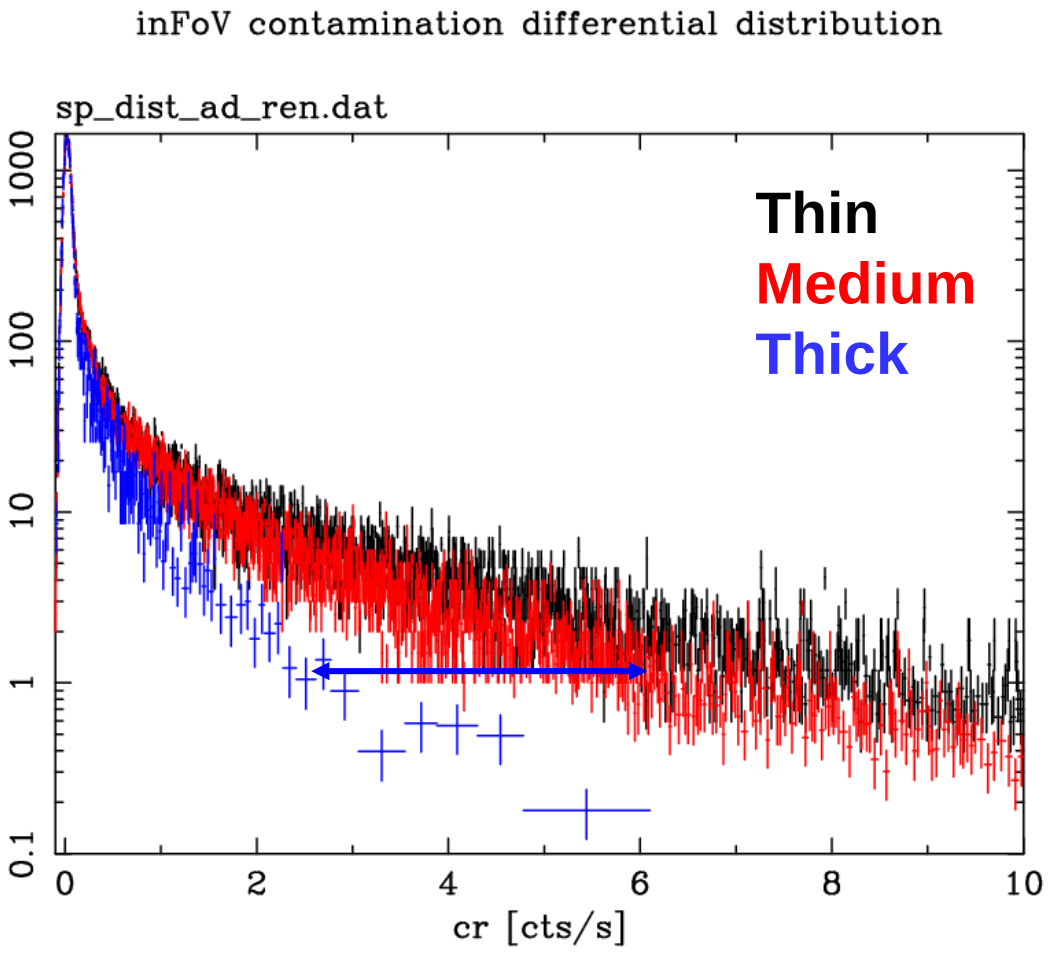


Orbit Time

Soft Protons vs Environment

Environment	Median cr	Mean cr
4. Mag.Sphere Tail	0.65	1.89
5. Mag.Sphere Sun	0.047	0.542
6. Mag.Sheath	0.051	0.545
7. Solar wind	0.037	0.424

Soft Protons vs Filters



Soft protons vs Filters

Filter	Median cr	Mean cr
Thin	0.061	0.783
Medium	0.055	0.560
Thick	0.037	0.179

Summary

- Significant scientific information in EPIC data which cannot be exploited because of sys errors
- Started long term project to characterize EPIC bkg

First results encouraging

- High energy induced component stable and highly reproducible
- Soft protons more complex behaviour