Activities in Milano Bicocca

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On behalf of
INFN Milano Bicocca group

Trapped Particles & Trajectories

Ions from A. Oliva

Backtracing and analysis performed by D. Grandi and D. Rozza

Tailored code for trapped particles:

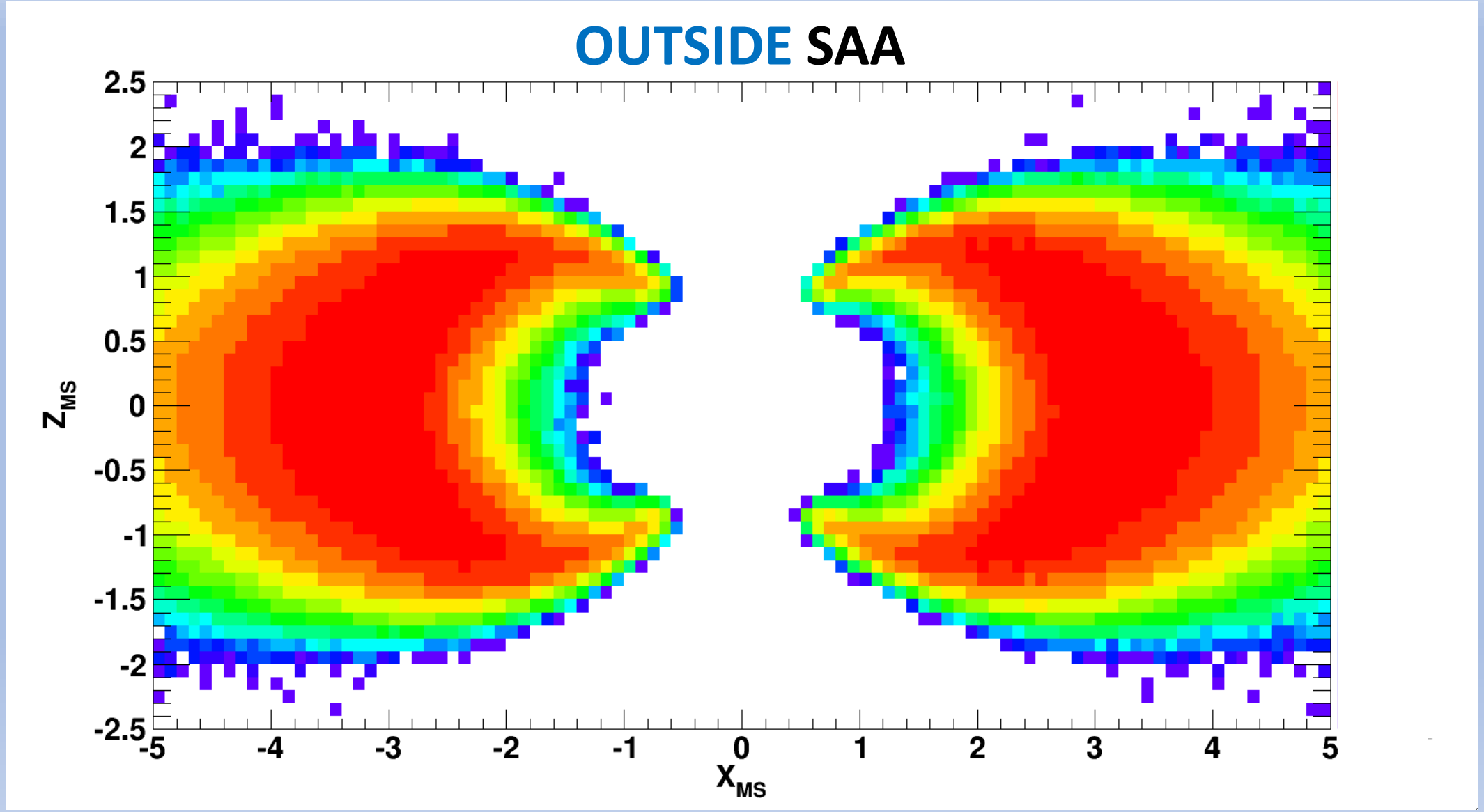
- High precision (10^{-4} rad angle between 2 consecutive velocities)
- Inner boundary decreased to 20 km (typical altitude of CR air showers starting point)
- Increase time limit (up to 10 min of “real” trajectory time)
- Particles main request to be considered as trapped: a WHOLE drift shell (> 360° in longitude)

Preliminary results

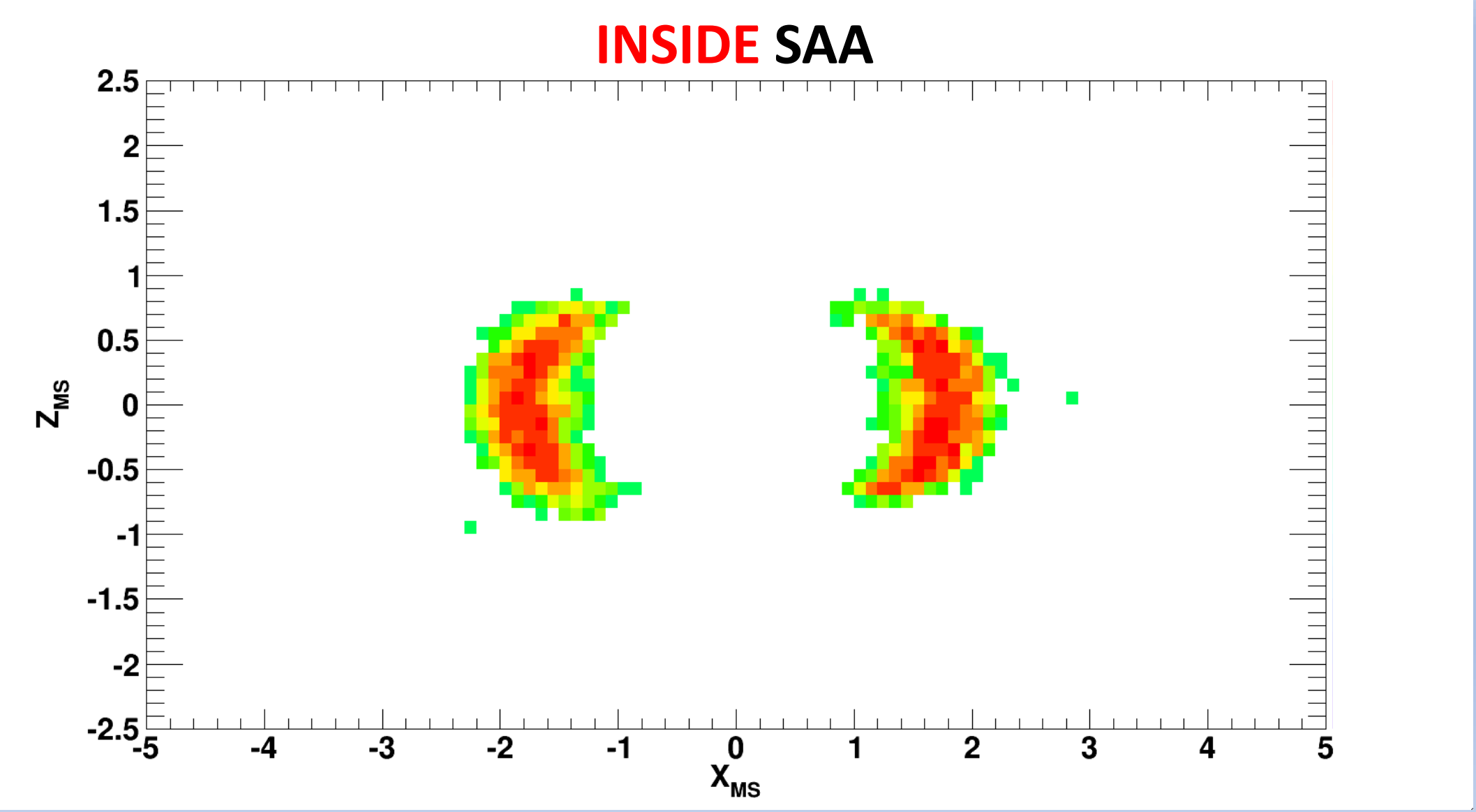
Trapped Ions

- From both Inner and Outer radiation belt?
- Different detection positions
- Different lifetime and trajectories
- From both samples (upgoing and downgoing particles)
- Introduced: Equatorial Pitch Angle and L-Shell analysis

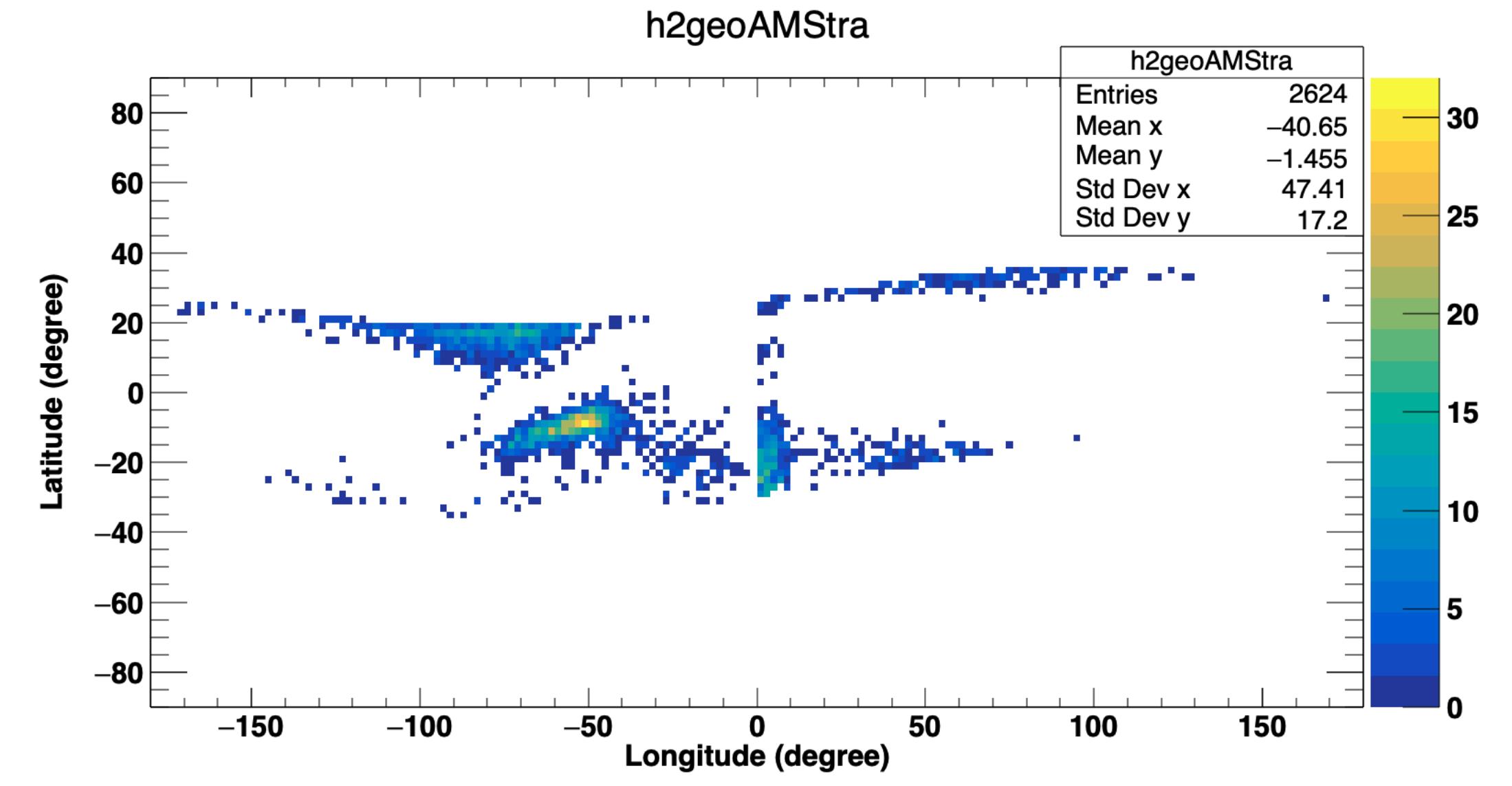
Trapped Protons



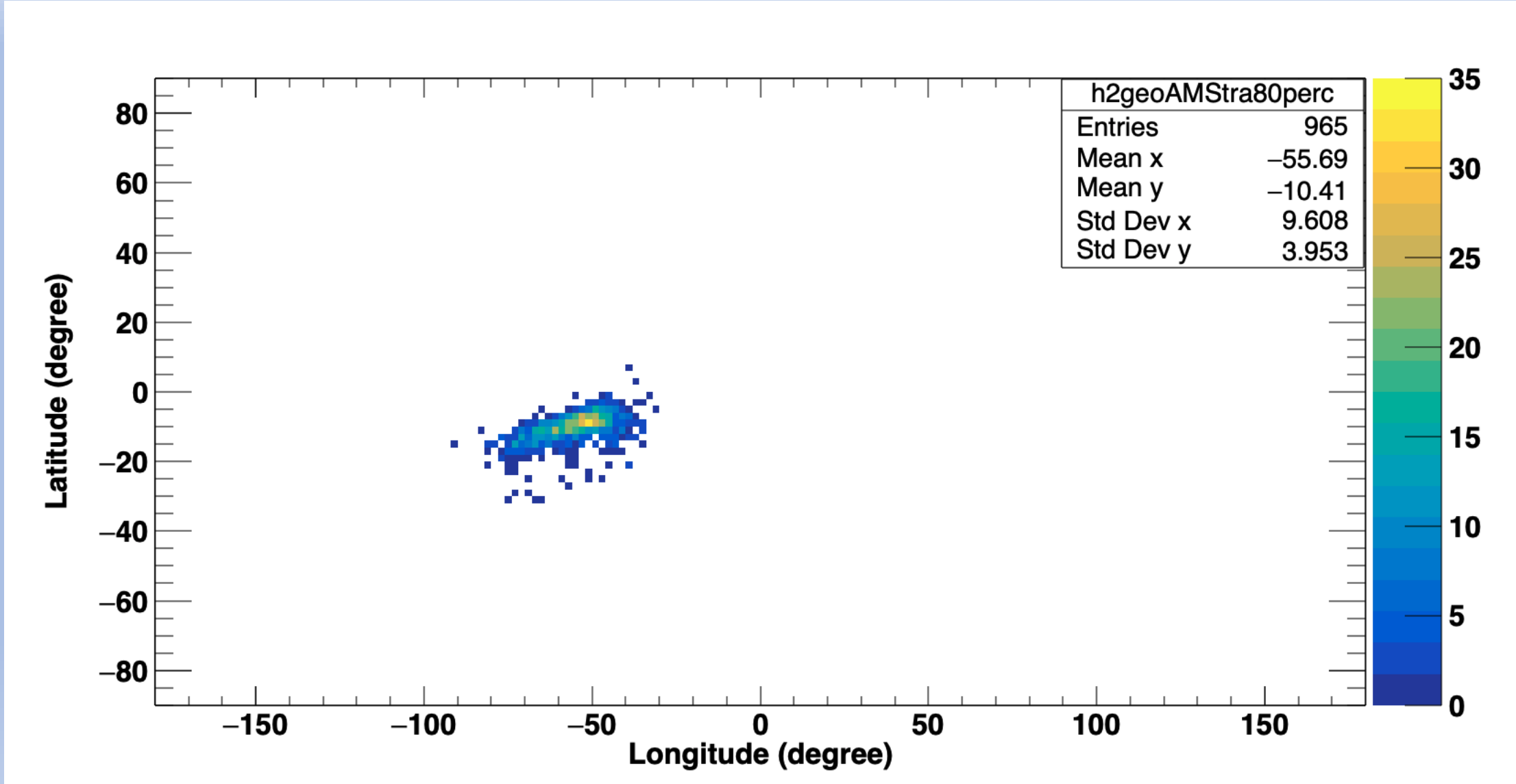
Trapped Protons



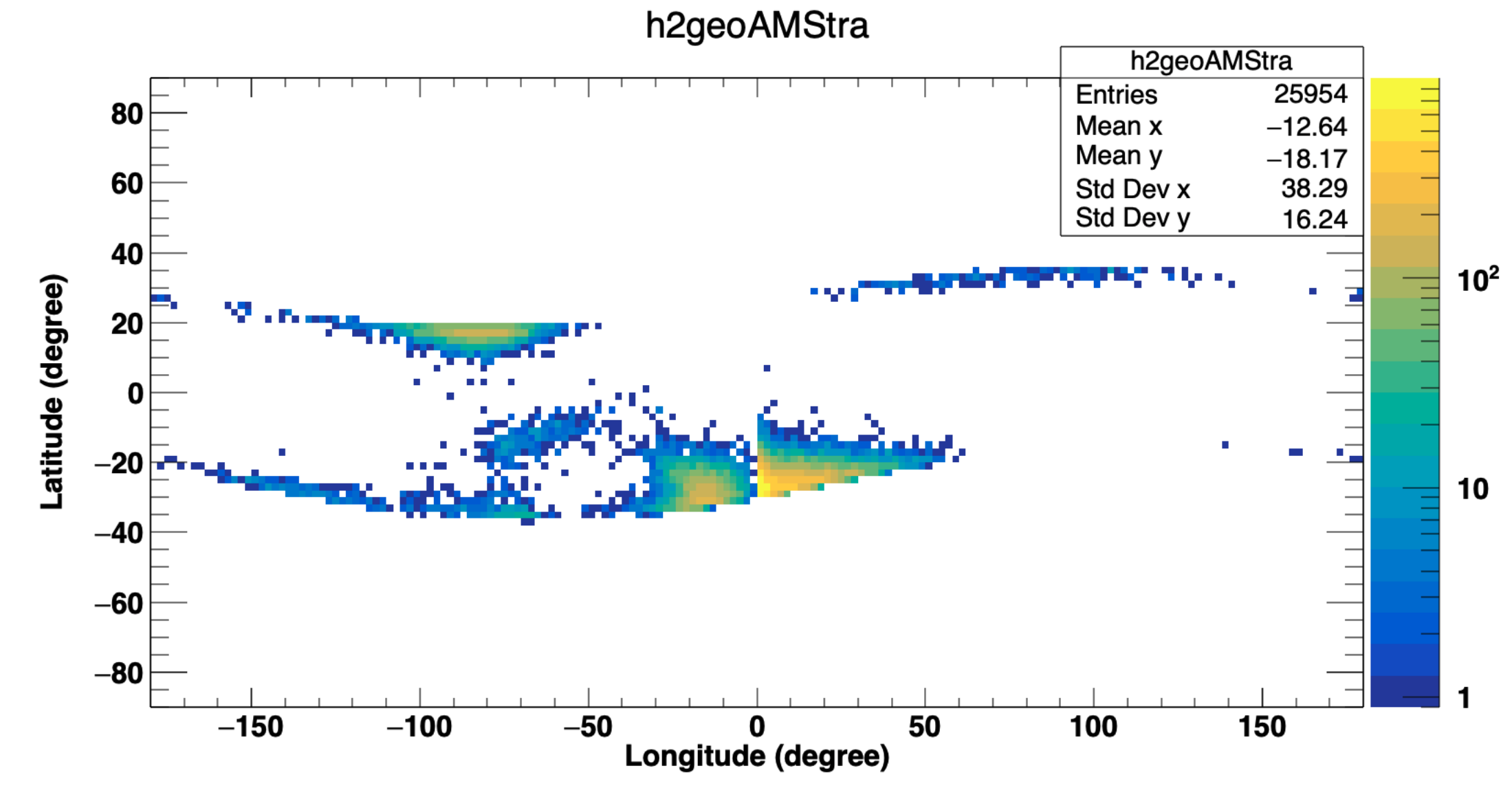
Upgoing ions from GeoMagSphere BkT



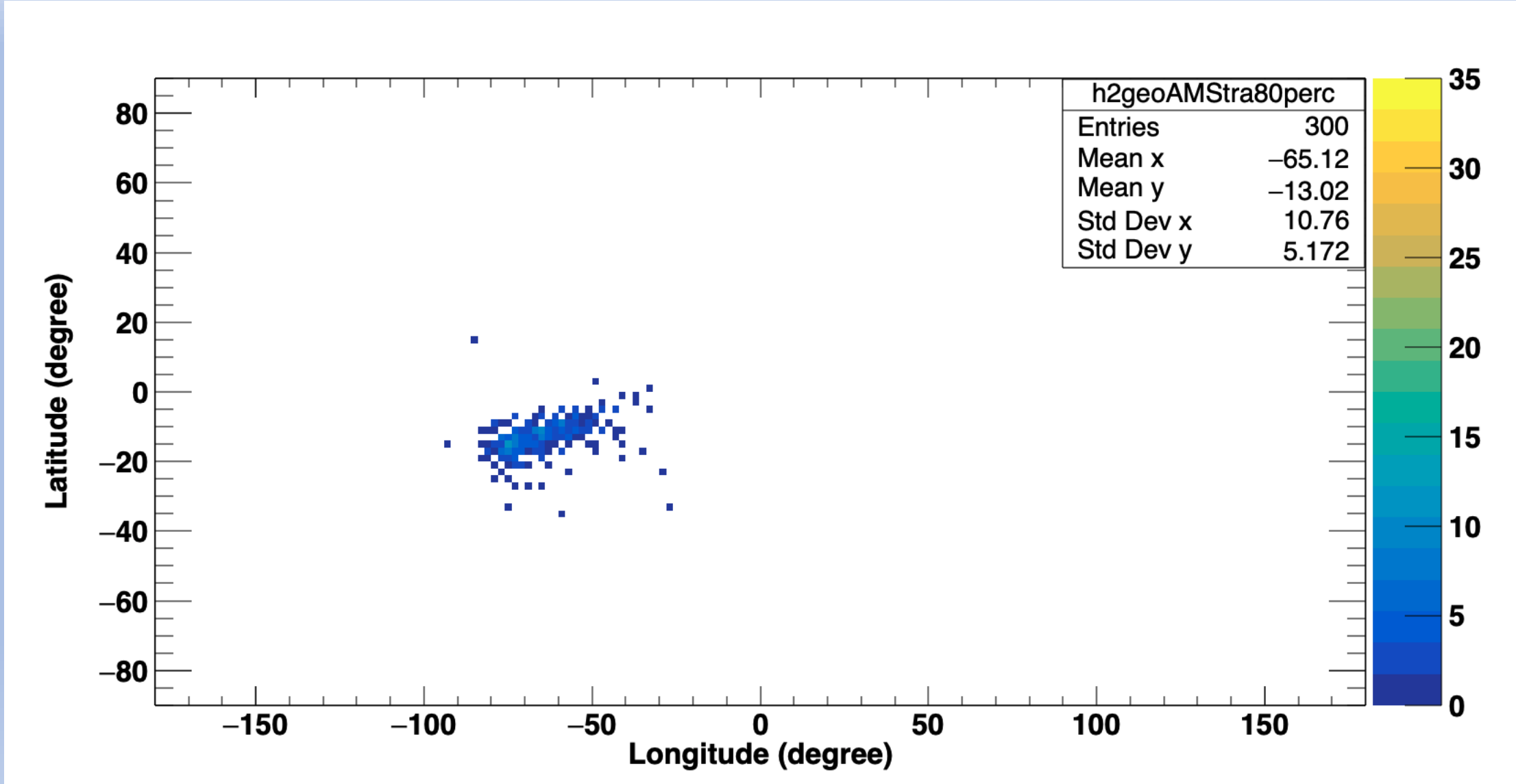
Upgoing ions from GeoMagSphere BkT requiring 8/10 particles **generated** are trapped



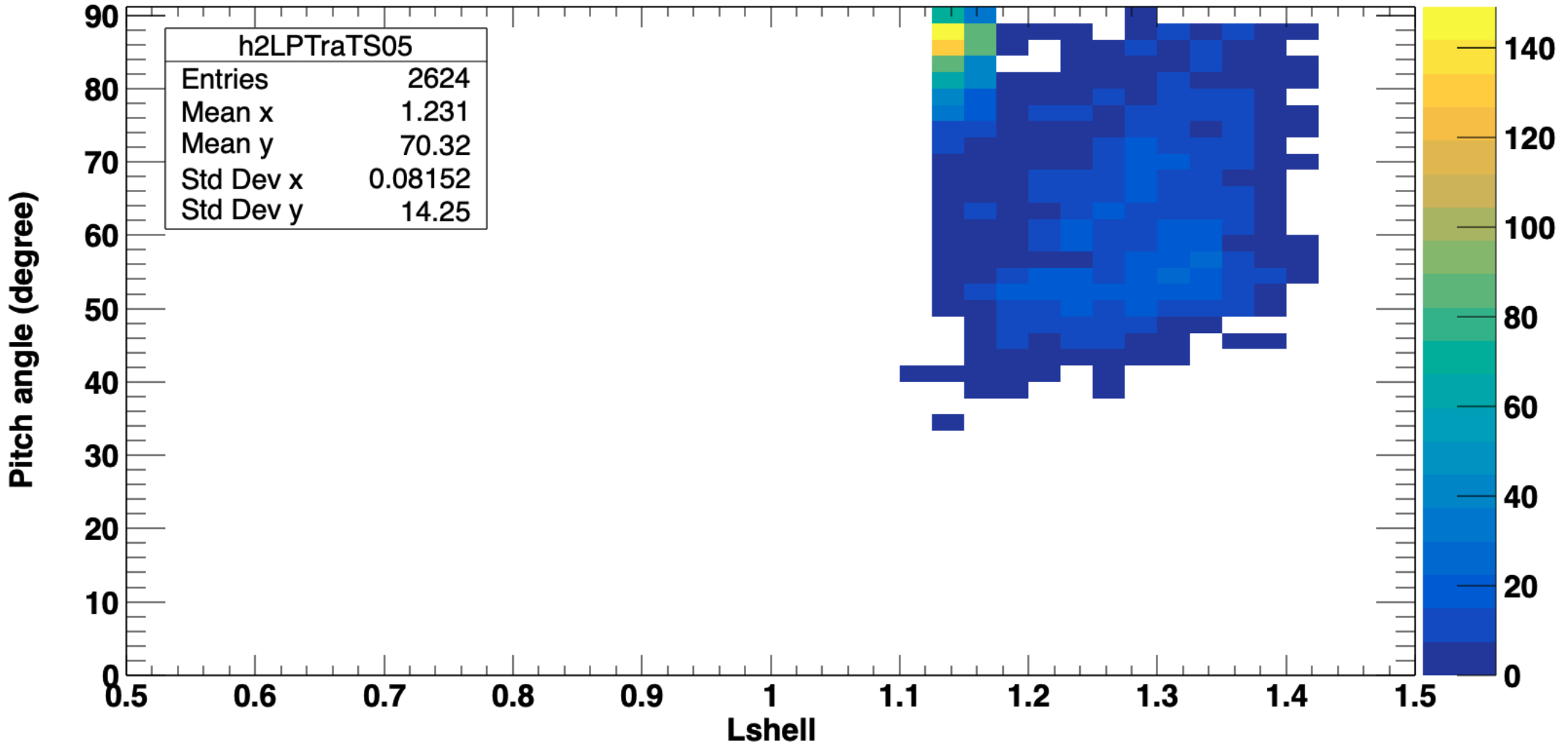
Downgoing ions from GeoMagSphere BkT



Downgoing ions from GeoMagSphere BkT requiring 8/10 particles **generated** are trapped



Upgoing ions Pitch angle vs Lshell



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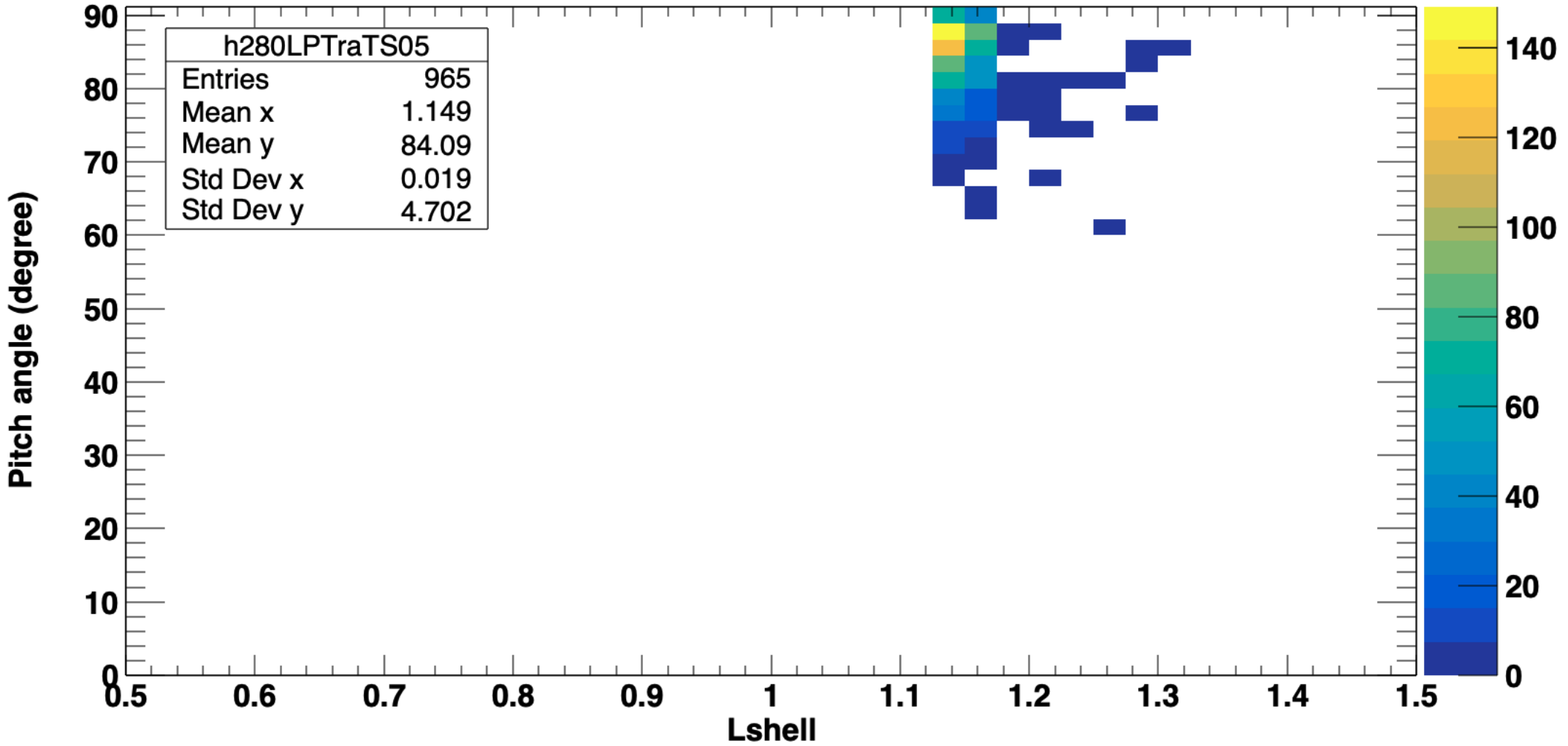

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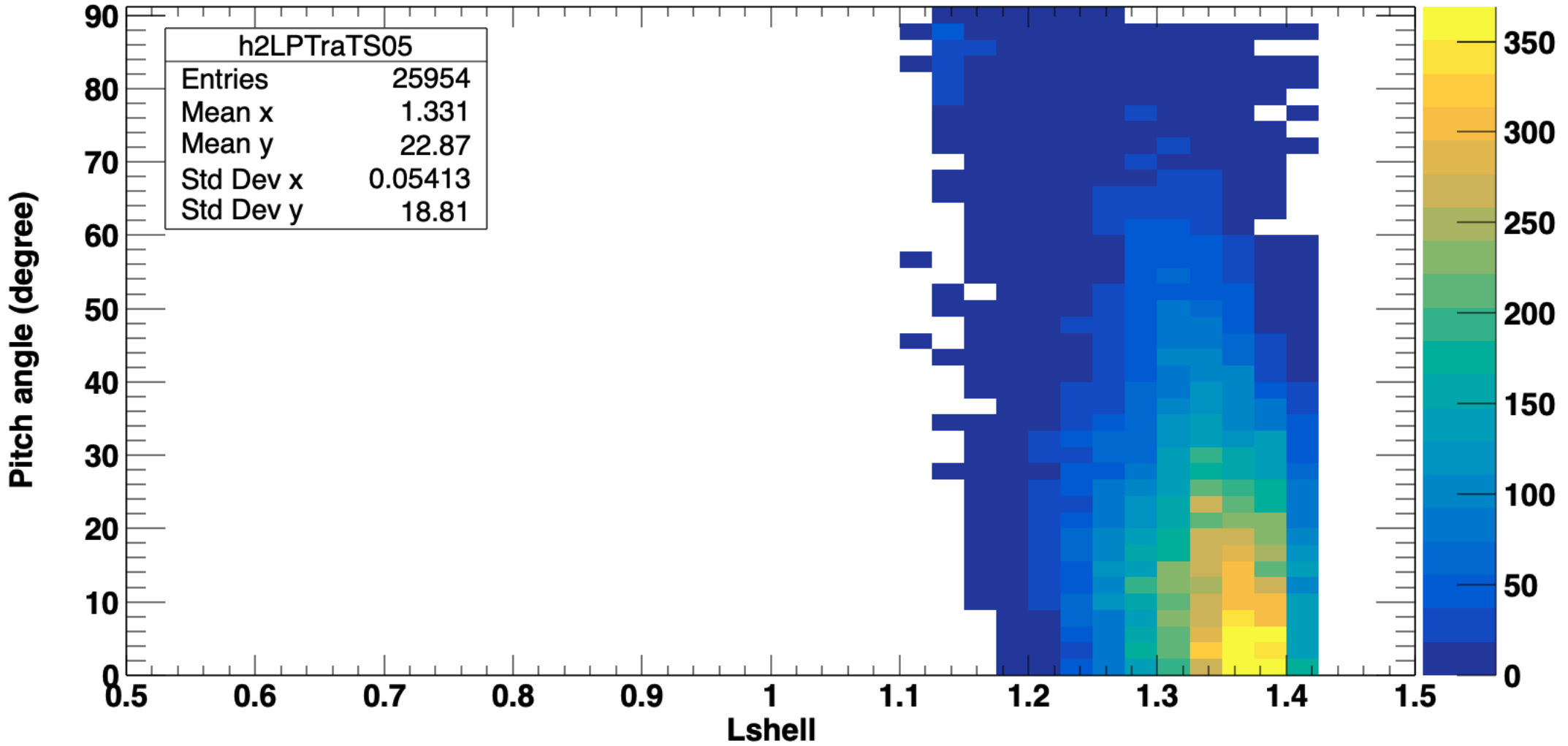

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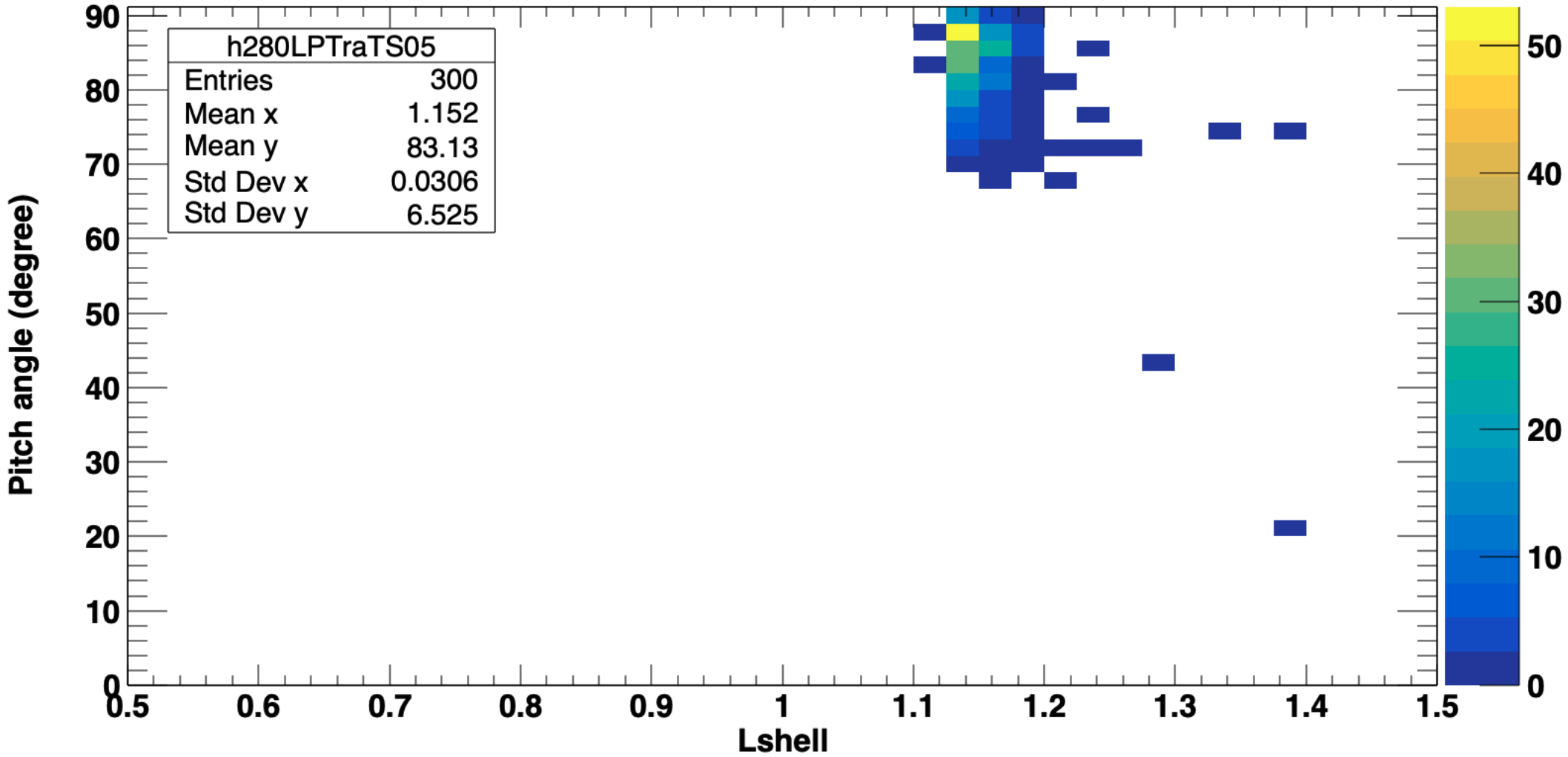
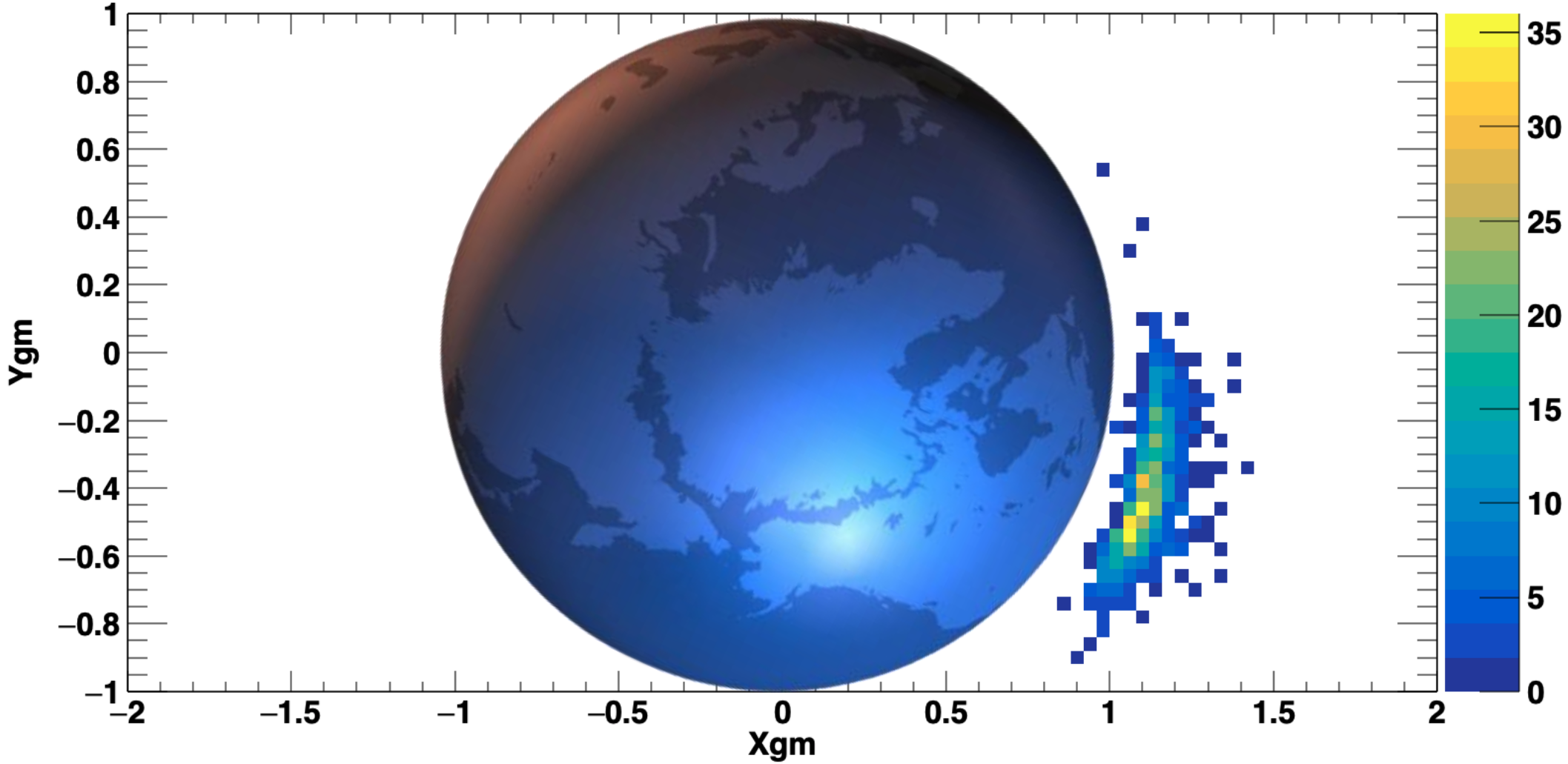
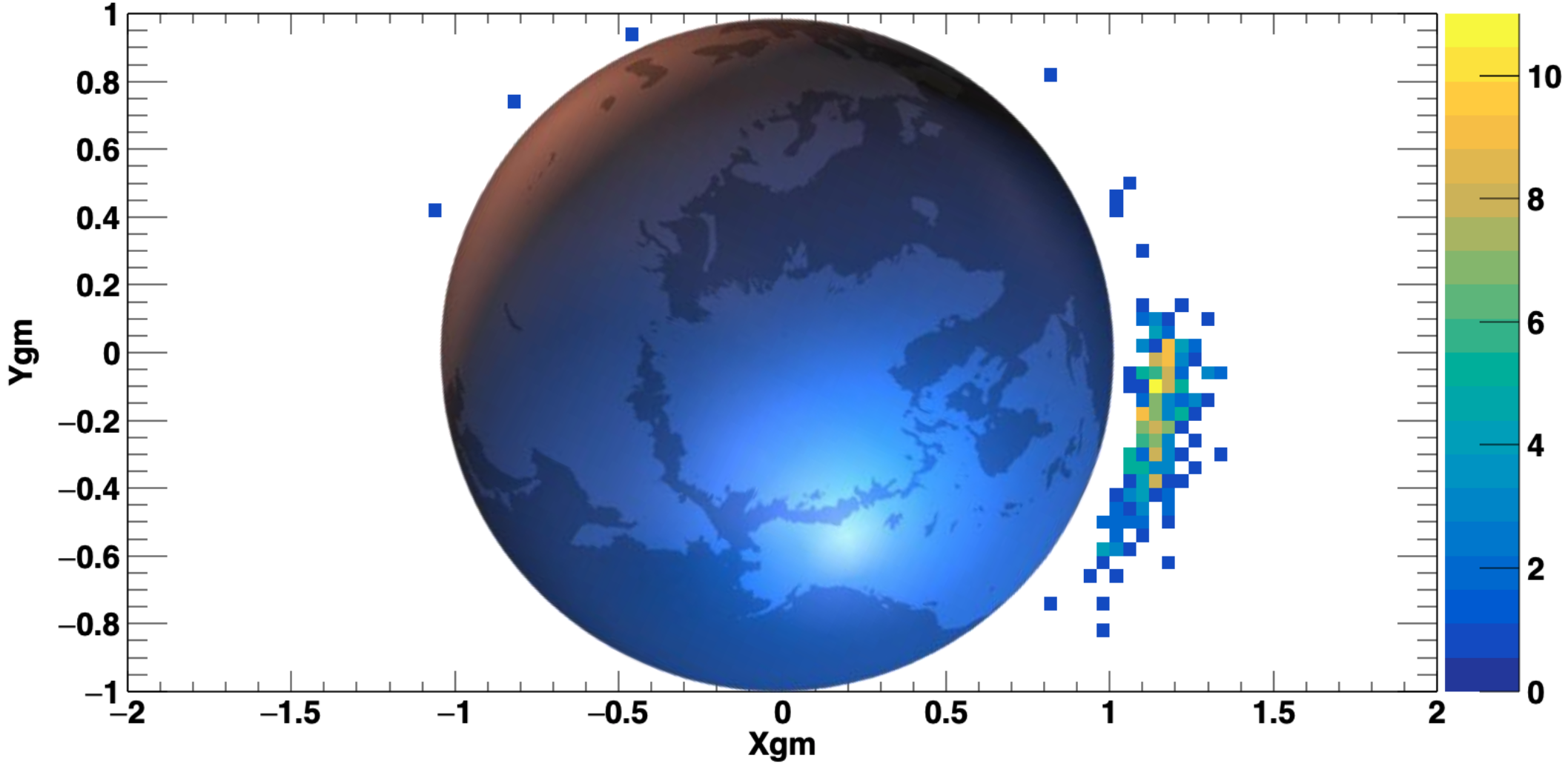


Upgoing ions Final position after Backtracing requiring 8/10 particles **generated** are trapped

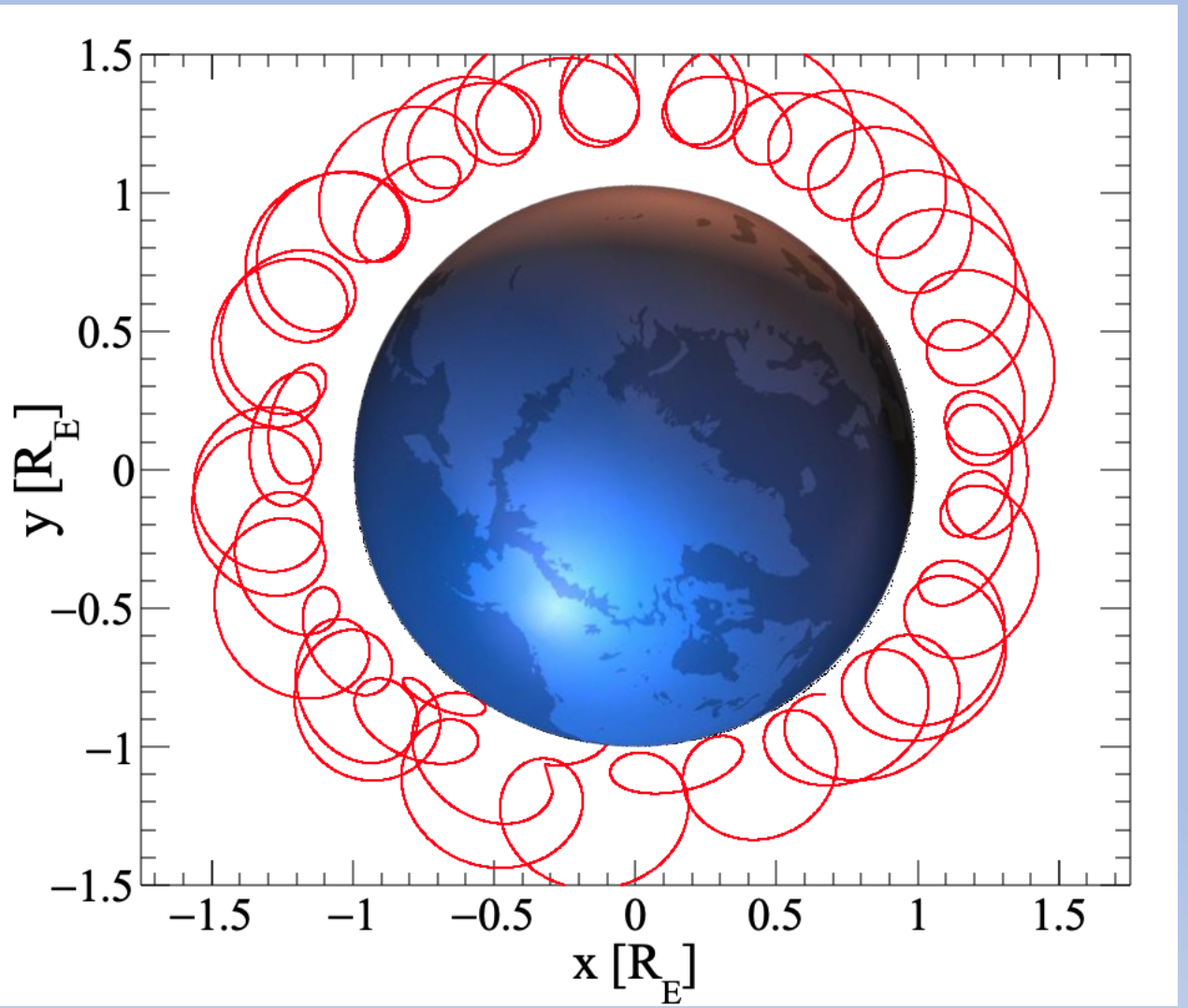


Downgoing ions Final position after Backtracing requiring 8/10 particles **generated** are trapped

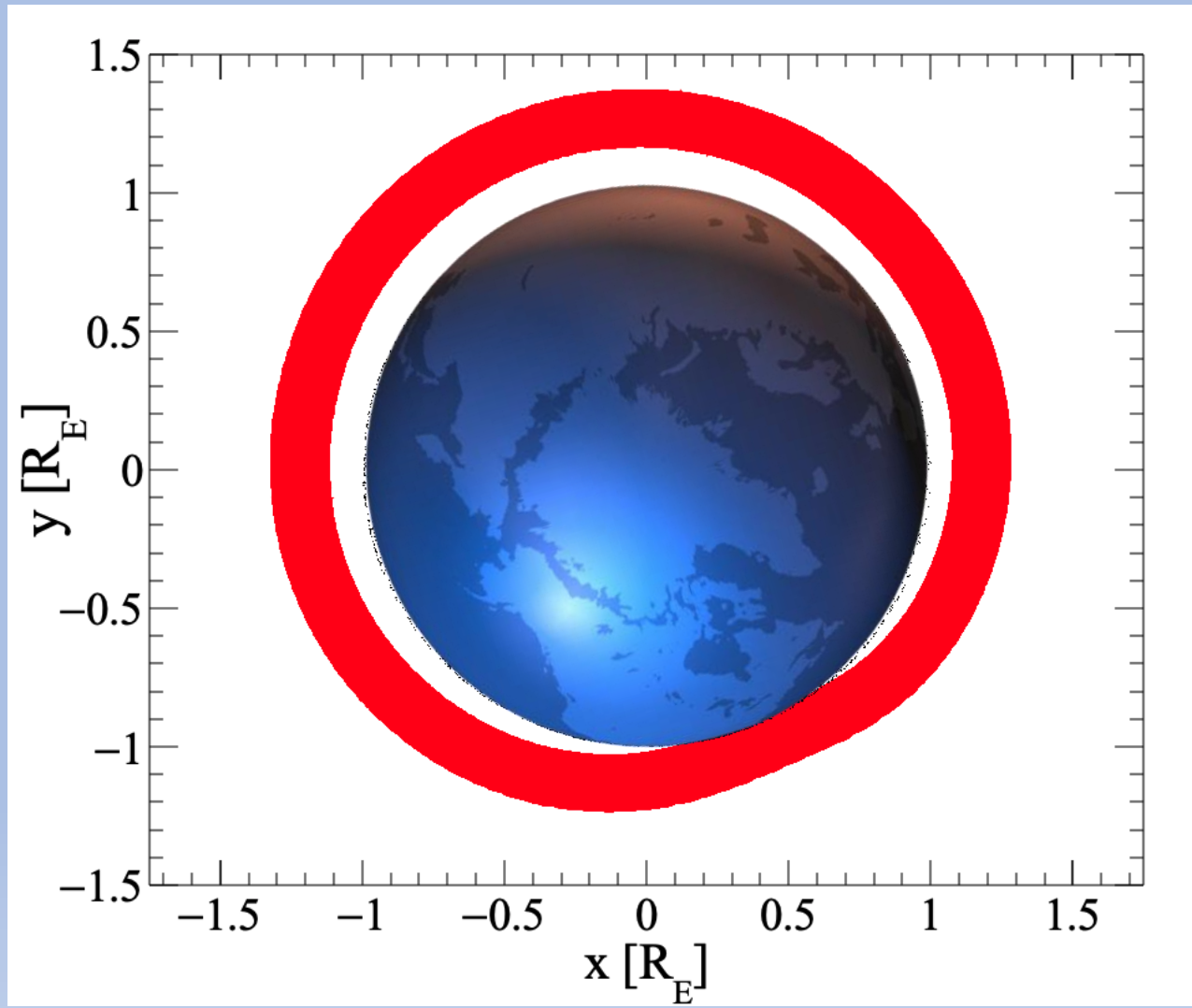


Upgoing ions

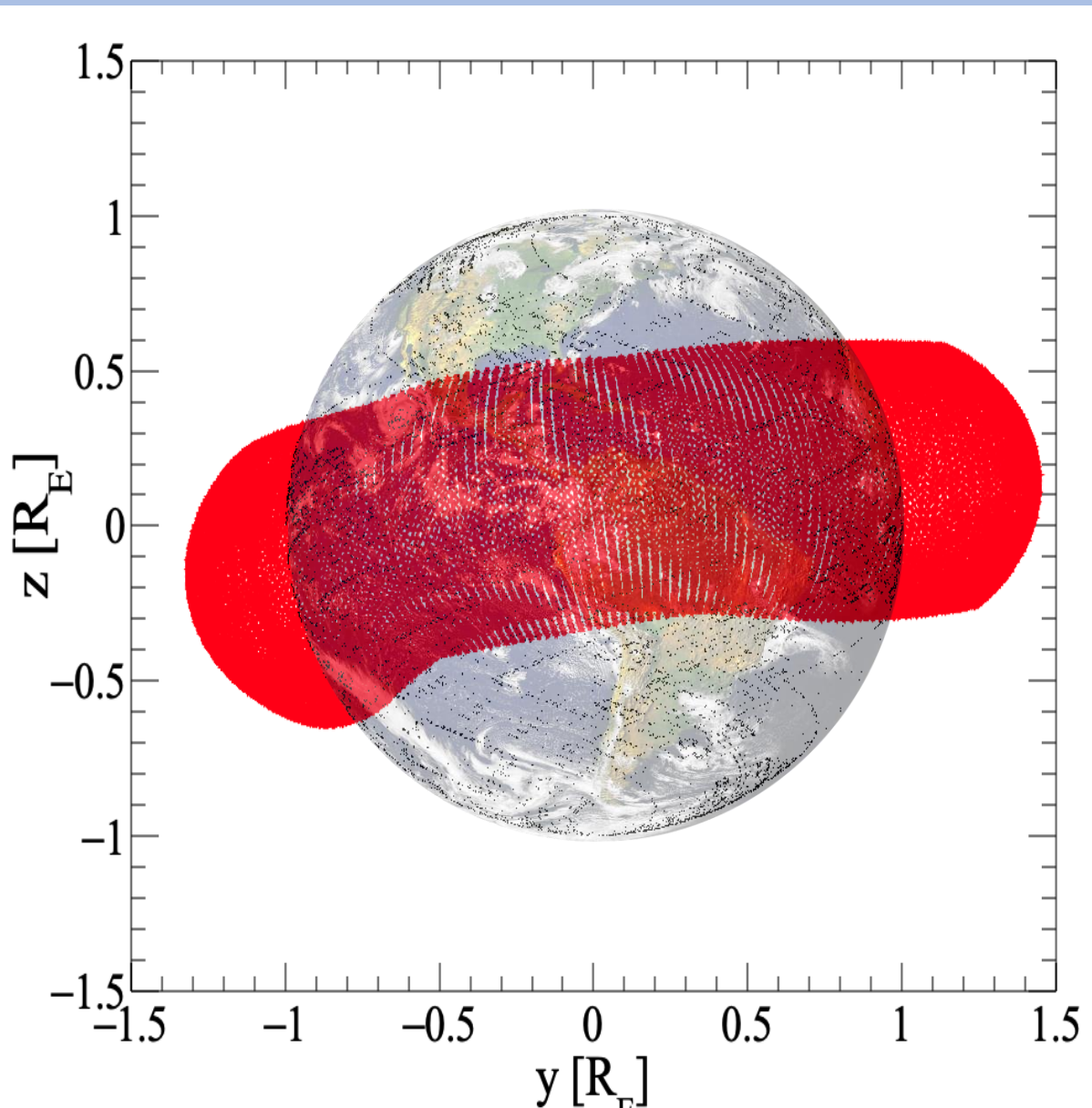
Boron (5.65 GV)

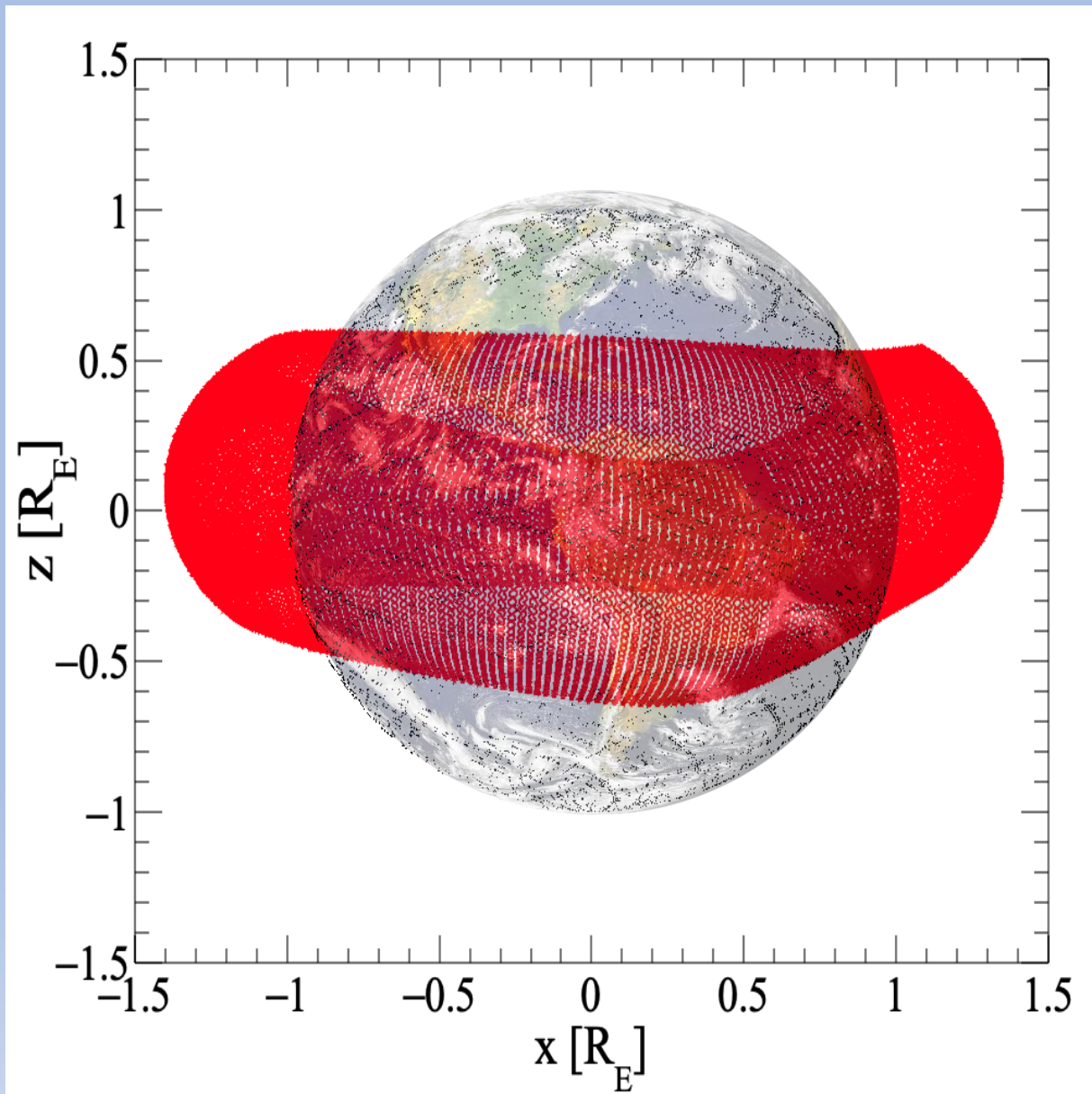


Carbon (3.02 GV)



Trapped Lithium





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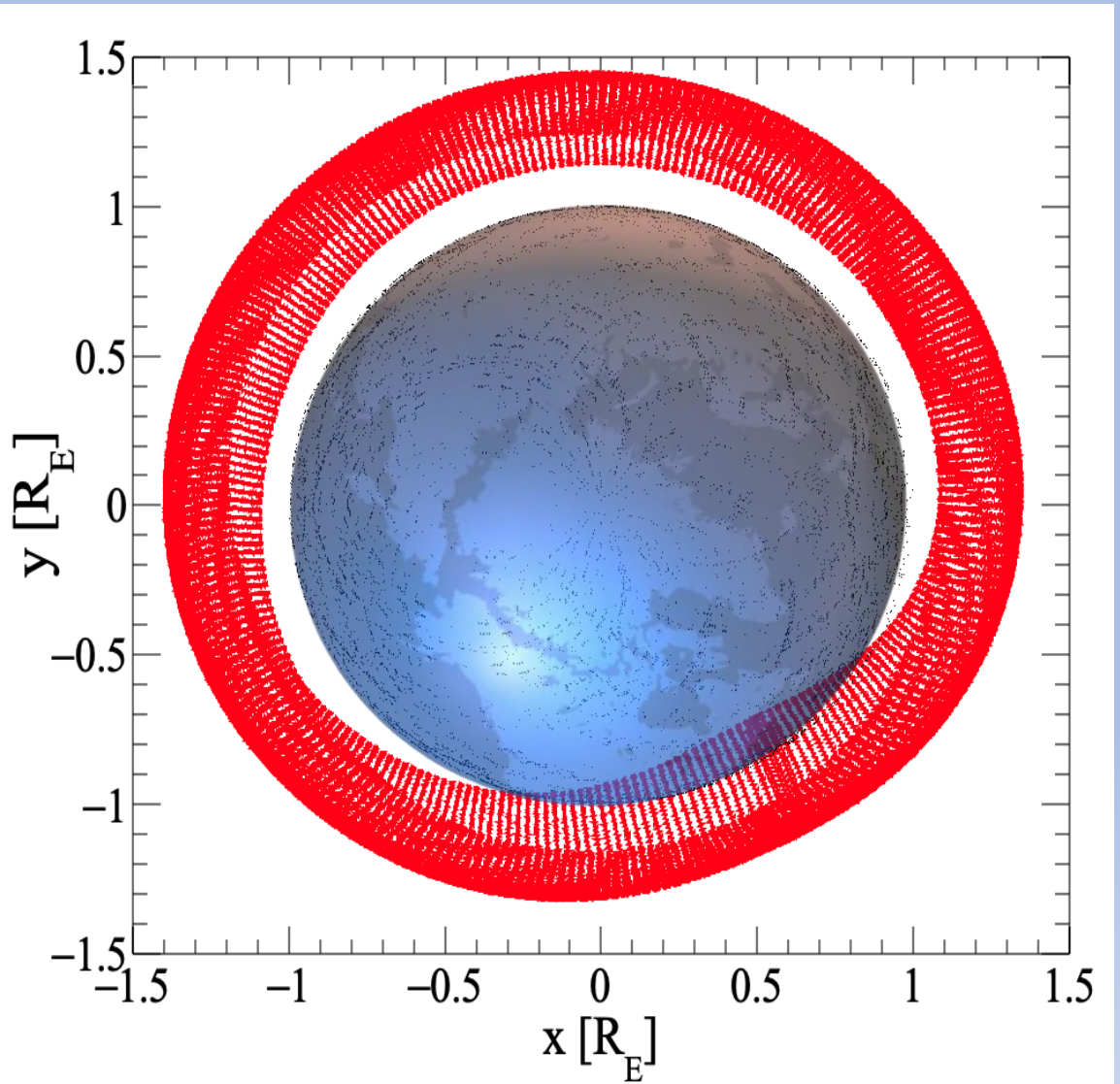
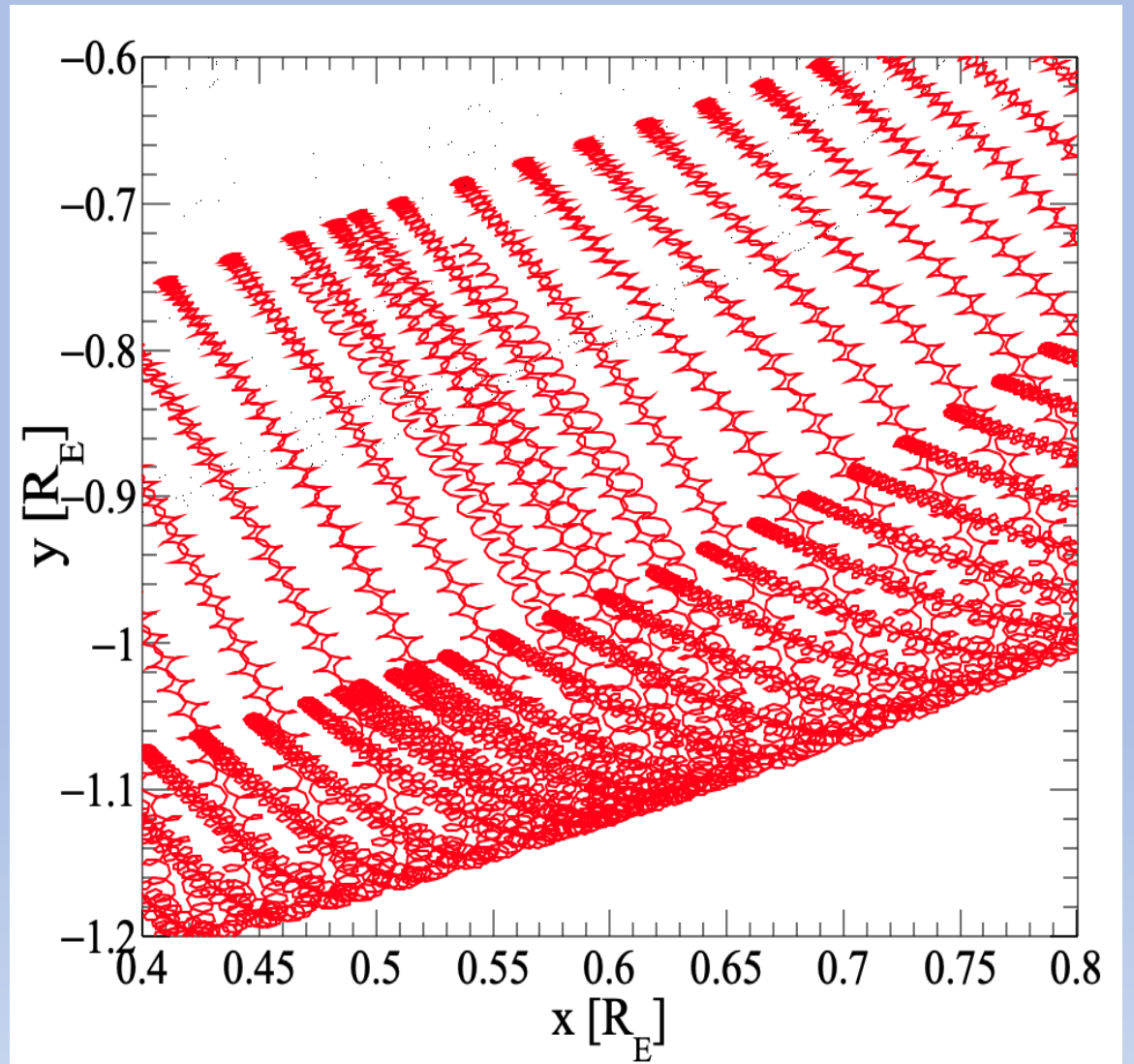




Website implementation

- New analysis parameters has been added as a online calculator to our main website www.geomagsphere.org
- Through some dedicated webpages the user can obtain the
- The needed parameters are specified in each calculation webpage
- The L-Shell can be evaluated for all kind of particles
- Equatorial Pitch Angle as for now can be calculated for positive particles (protons and ions)

Future plans

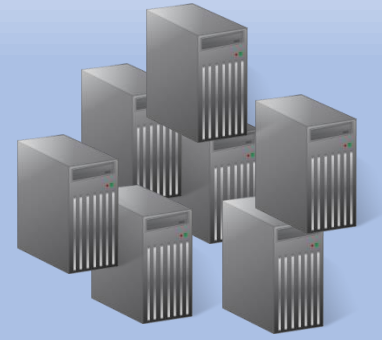
- Trapped Protons & Helium
  - Sample inside the SAA & outside the SAA (polar)
  - to be used as a “comparison”
- Trapped Ions
  - Reduce the request of sigma in “generated” particle (for 8/10)
  - Extend in time the Ions to be backtraced

Data transfer

AMS

AMS-laptop

GSC @ MSFC



AMS POCC & SOC @CERN

CNAF data center

DT sw runs as a deamon, checking for new files every 5 min.

This means that the RAW stream is essentialy a continuous stream, while the REC stream goes in bursts, following the pass reconstruction process.

	In 2024		From the beginning	
Dataset	#files	Size (TB)	#files	Size (TB)
RAW	147464	**44**	2205251	**518**
REC	0	**0**	943717	**3378**

RAW + REC

Contract with Cineca for implementation and maintenance of the AMS applications

RECs are no more transferred, since the advent of the NAIA framework