Determination of Expected TIGERISS Observations

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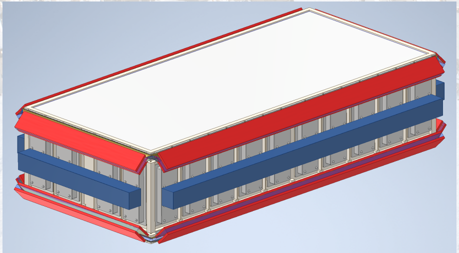
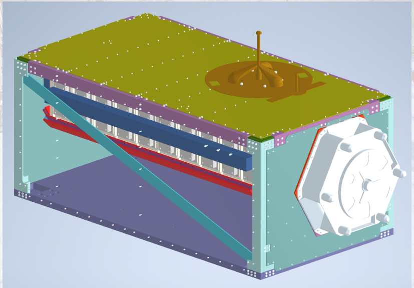
TIGERISS Instrument

Technical model of TIGERISS detector stack (**left**). TIGERISS instrument model shown mounted on the JEM-EF pallet (**right**), with ample space for thermal, power and electronics systems. The results shown assume detector dimensions that are compatible with the ISSCREAM JEM-EF mounting location.

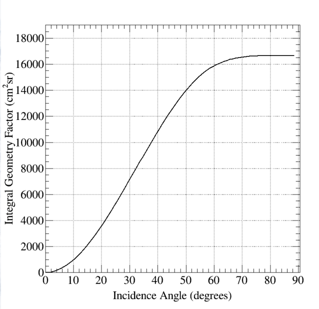


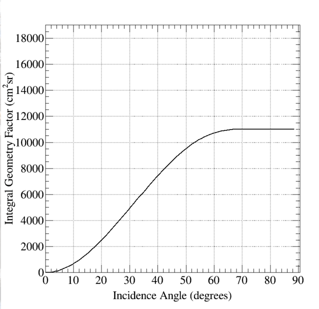


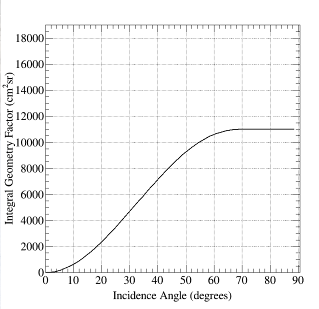
Configurations

Left to right:

JEM-EF configuration:	167.0 cm(L) 67.0 cm(W) 40.0 cm(T)	~**1.66 m^2 sr**
ExPRESS Logistics Carrier (ELC):	105.0 cm(L) 75.0 cm(W) 40.0 cm(T)	~**1.10 m^2 sr**
ESA Columbus Laboratory ext. payload:	97.79 cm(L) 74.93 cm(W) 35.08 cm(T)	~**1.16 m^2 sr**



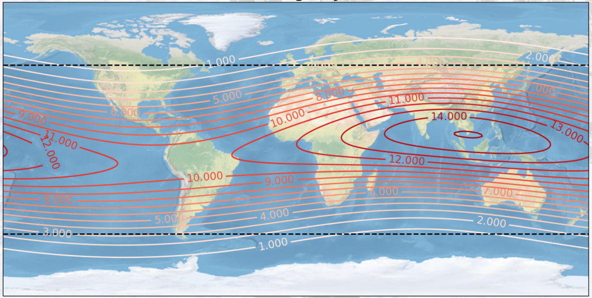


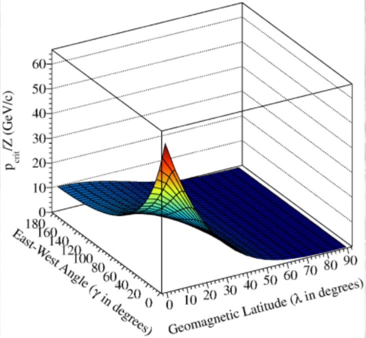


Modeling Geomagnetic Screening

The geomagnetic latitudes correspond to different vertical cutoff rigidities. The critical momentum needed to penetrate the geomagnetic field scales with the geomagnetic latitude and East-West angle as shown in the figure.

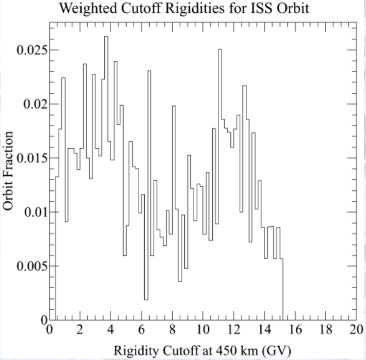
ISS rigidity

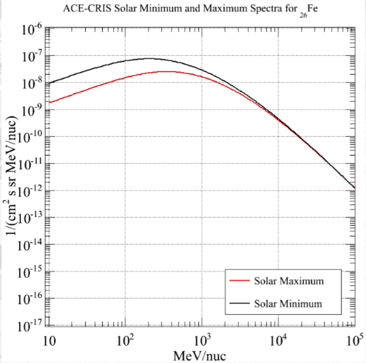




ISS Weighted Vertical Cutoff Rigidities

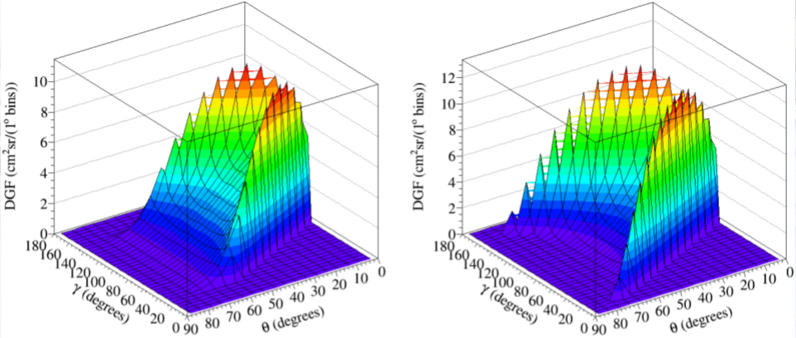
Left: The fraction of the ISS orbit spent at each vertical cutoff rigidity.
Right: The solar maximum and minimum iron spectra are integrated and scaled using relative abundances of heavier elements.



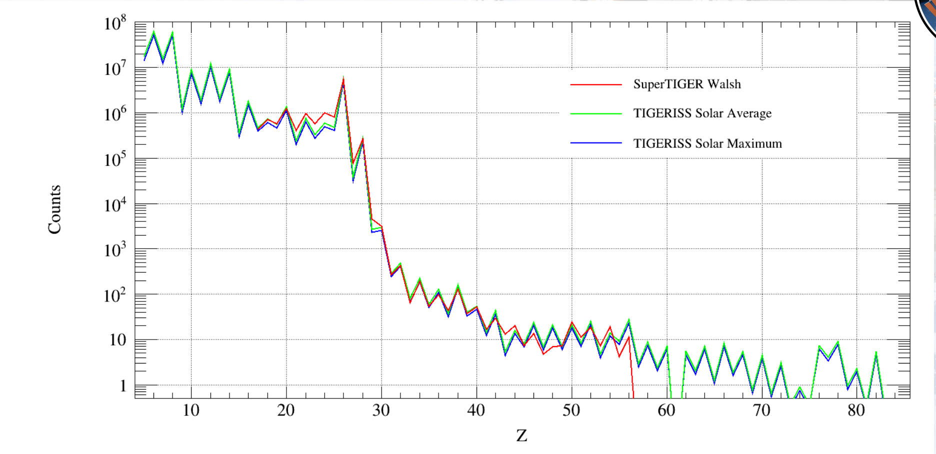


East-West Geometry Factors

The TIGERISS instrument differential geometry factor is mapped over all possible particle incidence angles (θ) and East-West angles (γ) and modelled for all ISS inclination angles with 1 degree resolution. Two such maps are shown, in which the East-West angle is aligned with the instrument major (**left**) and minor (**right**) axes.



Predicted TIGERISS



Predicted abundances measured by TIGERISS after 1 year of operation are comparable to those measured by SuperTIGER over its 55 day long-duration-balloon flight

Acknowledgements

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