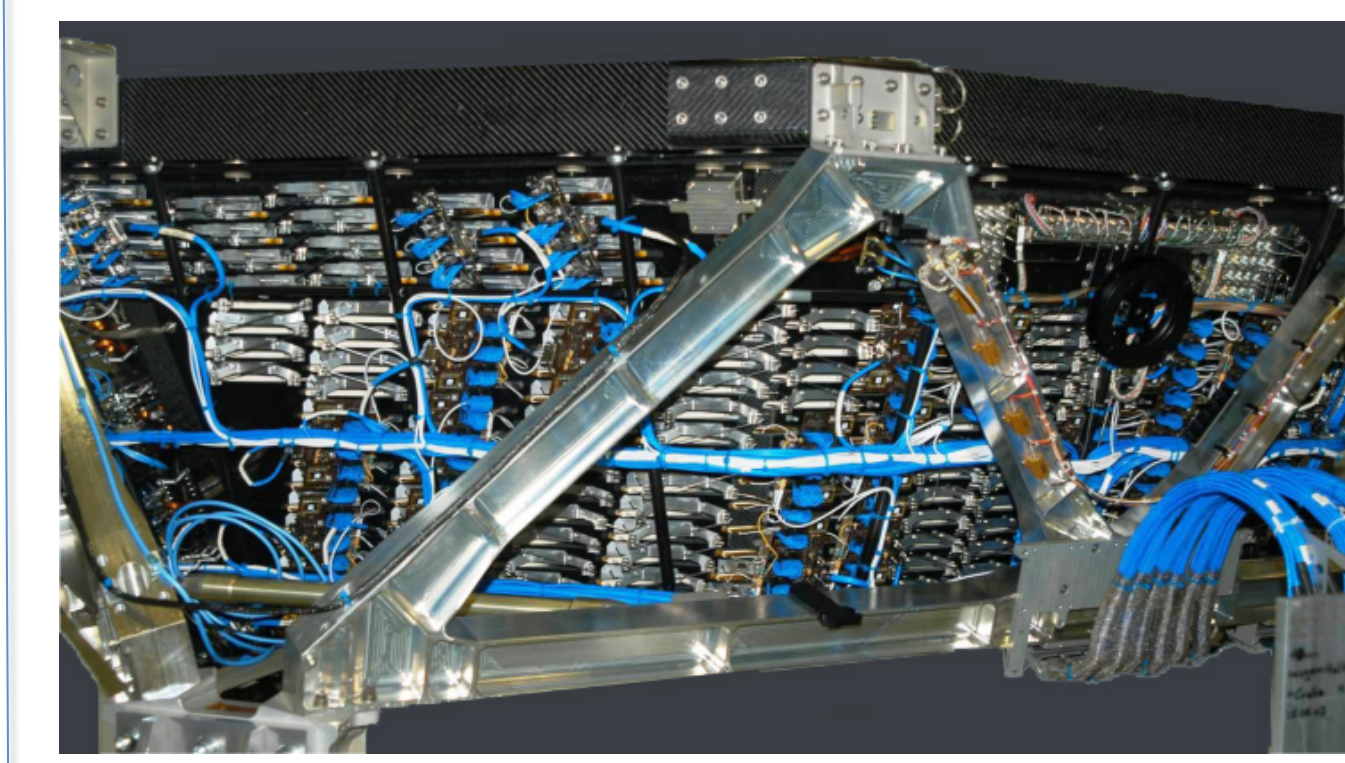
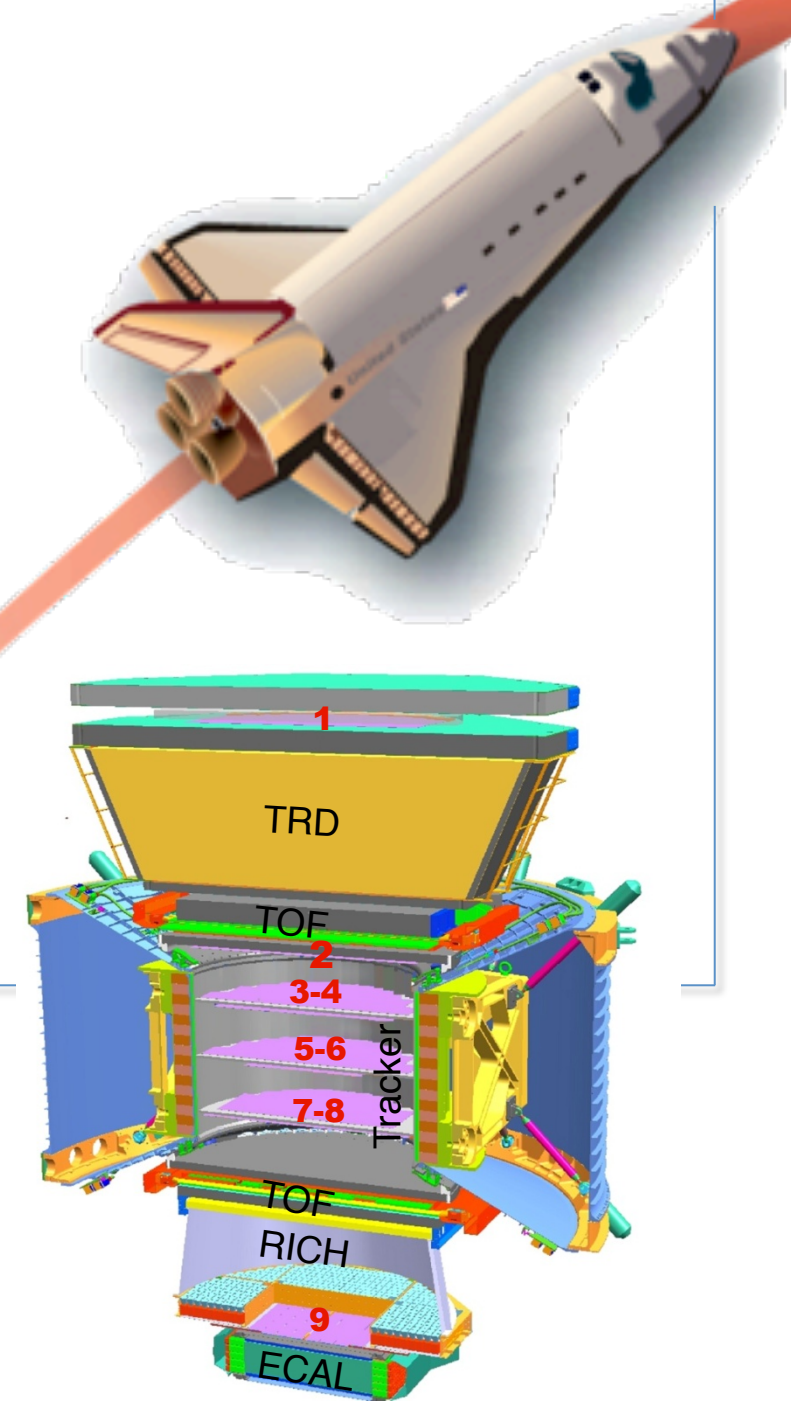


The AMS-02 detector was installed on May 2011 on board of the International Space Station and has since collected billions of Cosmic Ray events. AMS will measure with high precision Cosmic Ray spectra up to the TeV energy scale.

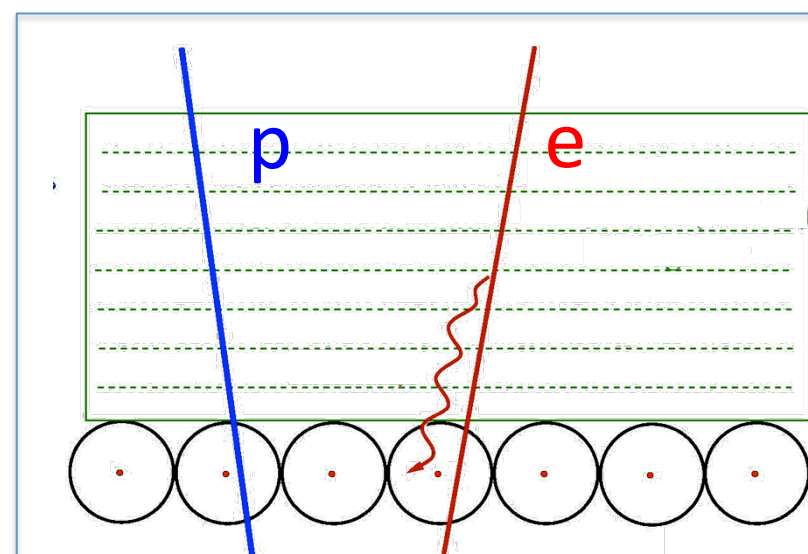


The AMS-02 TRD is a joint effort of INFN [Rome], RWTH [Aachen], MIT [Boston], KIT [Karlsruhe].

The Transition Radiation Detector, filled with a Xe/CO<sub>2</sub> mixture, is used to reach the sensitivity to positron identification needed for the detection of a neutralino dark matter candidate.

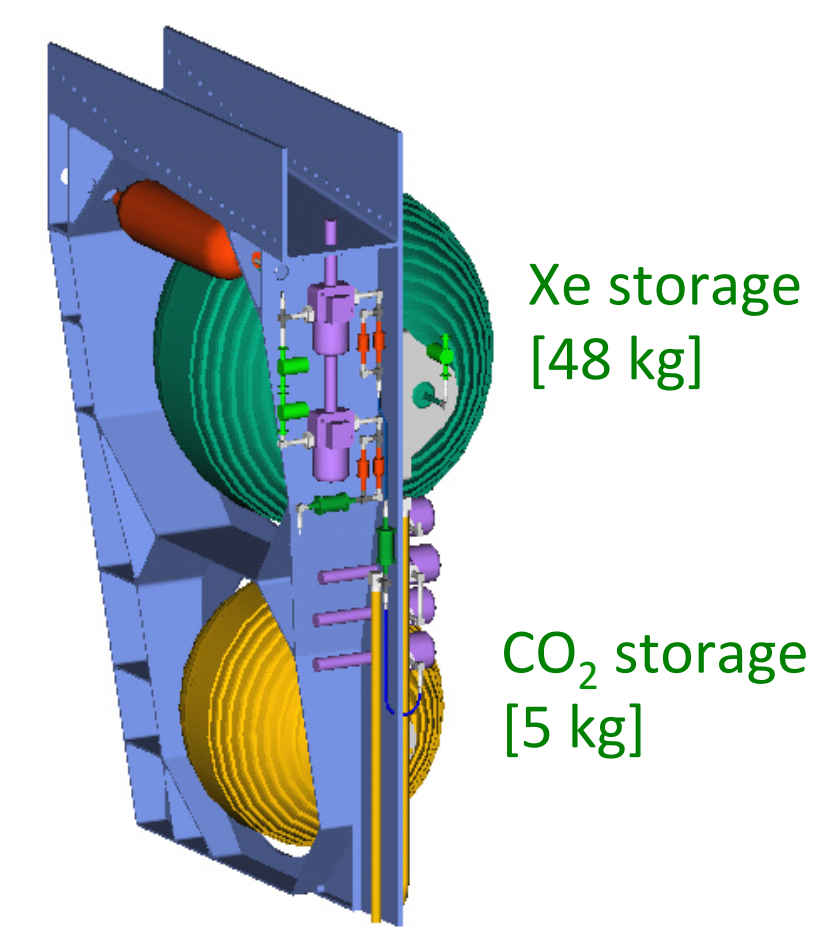
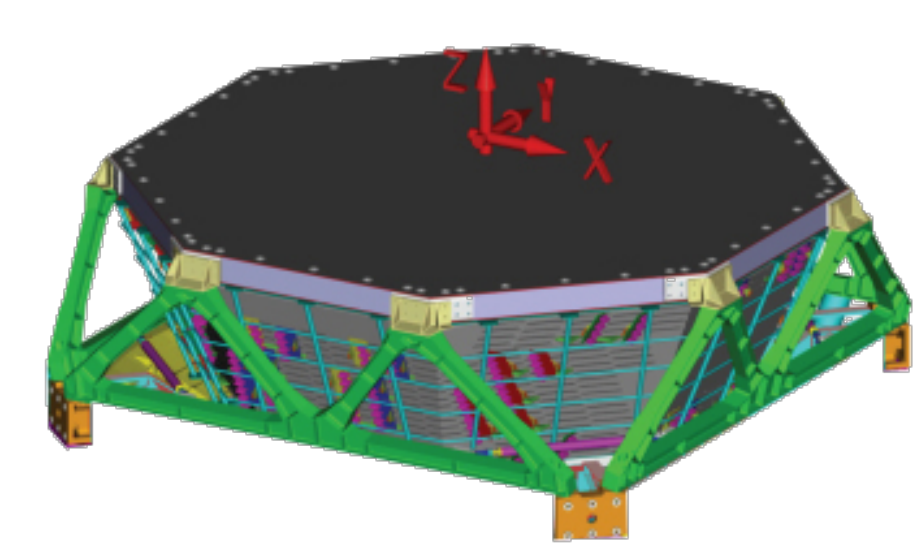


Francesca Spada  
INFN Rome, Italy



Radiator material: 22 mm fleece of polypropylene fibers  
Detecting material: 5,248 Ø 6 mm straw tubes filled with a [80:20] Xe/CO<sub>2</sub> mixture

TRD: 5,248 Pulse Heights  
Precision TRD Gas System:  
482 Temperature Sensors,  
8 Pressure Sensors  
Onboard processing:  
30 computers

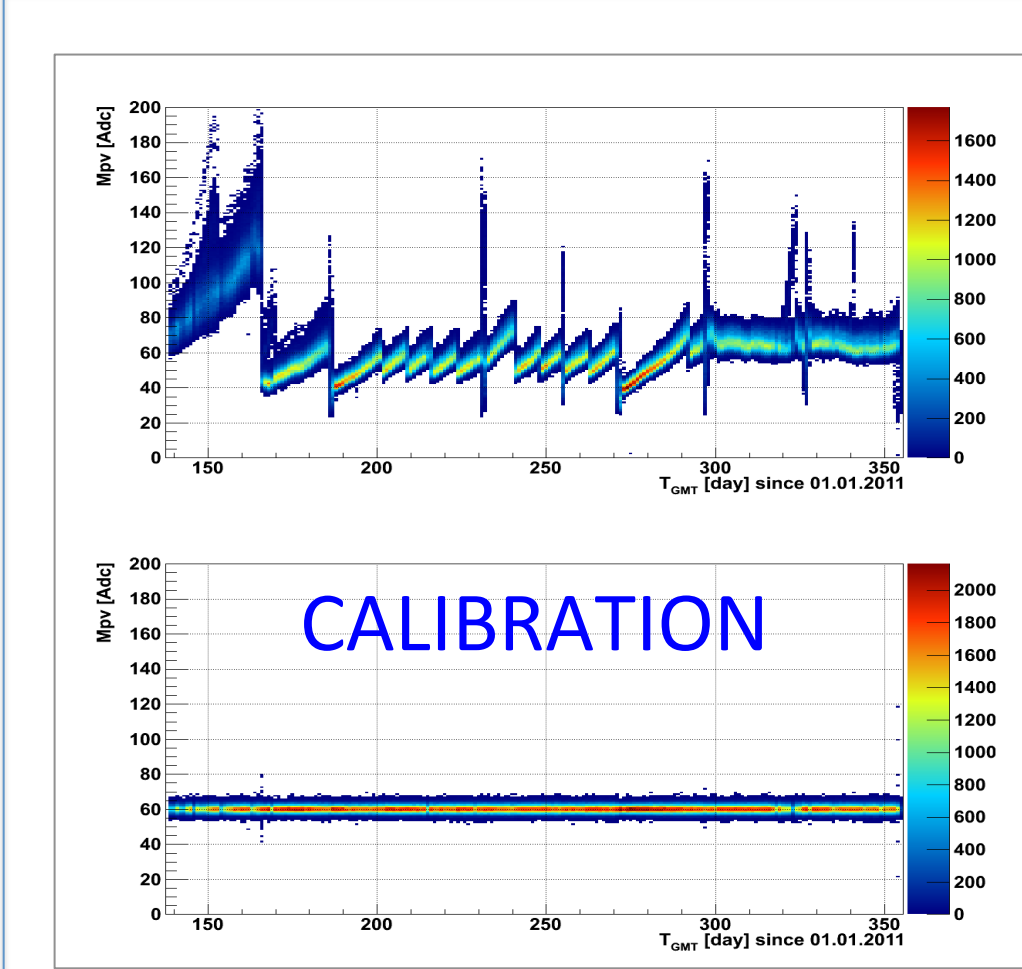


Gas supply: > 20 years



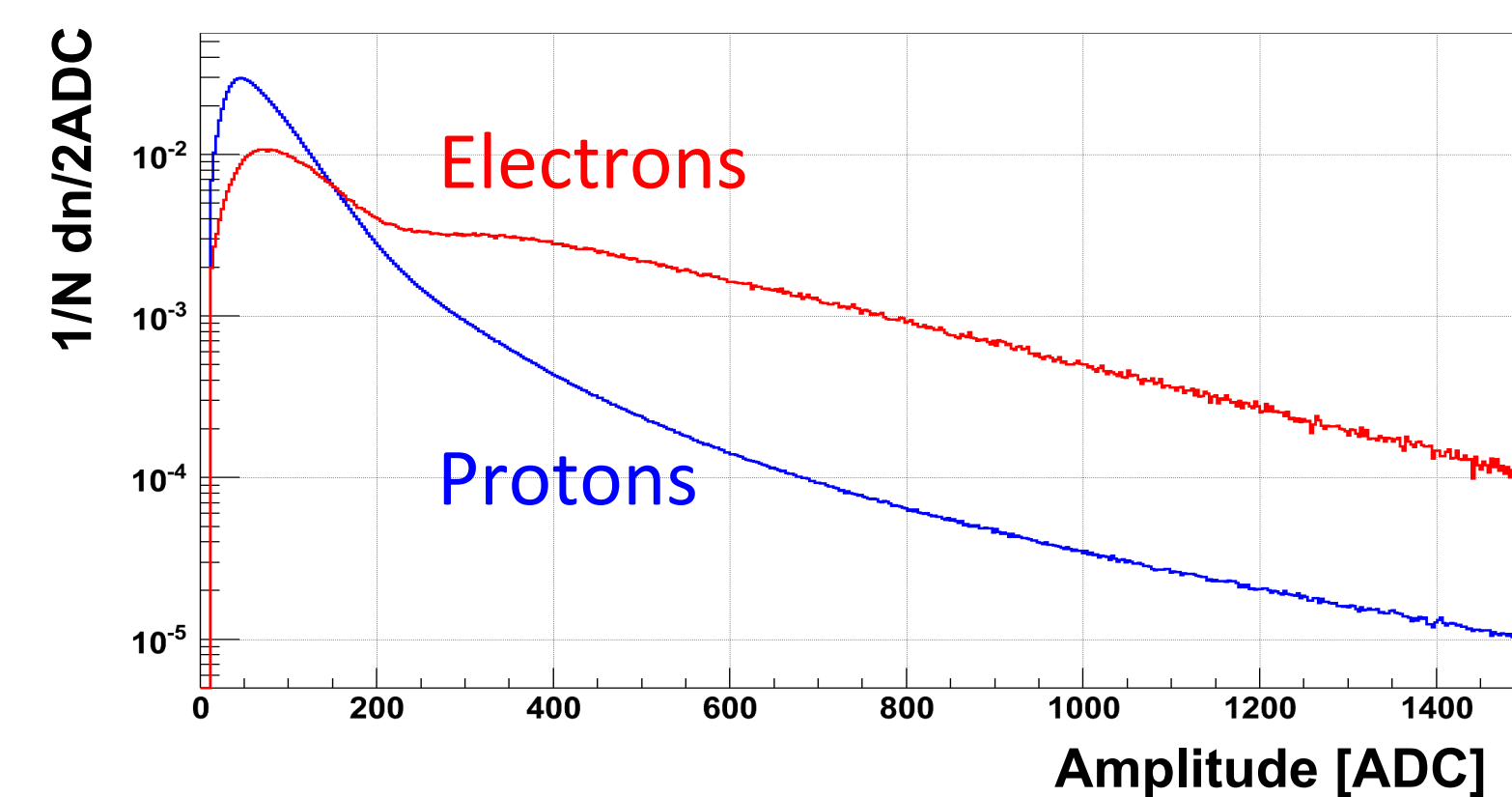
Cape Canaveral:  
Mission STS-134

# OPERATION OF THE AMS-02 TRD IN SPACE



Due to temperature, pressure, gas composition and HV changes, the TRD detector response is changing too.  
Due to temperature variations, the TRD is moving on top of the inner tracker by up to 1 mm.  
We use CR protons to equalize the TRD response to homogeneity within 3%, and align each straw module with an accuracy of 0.04 mm.

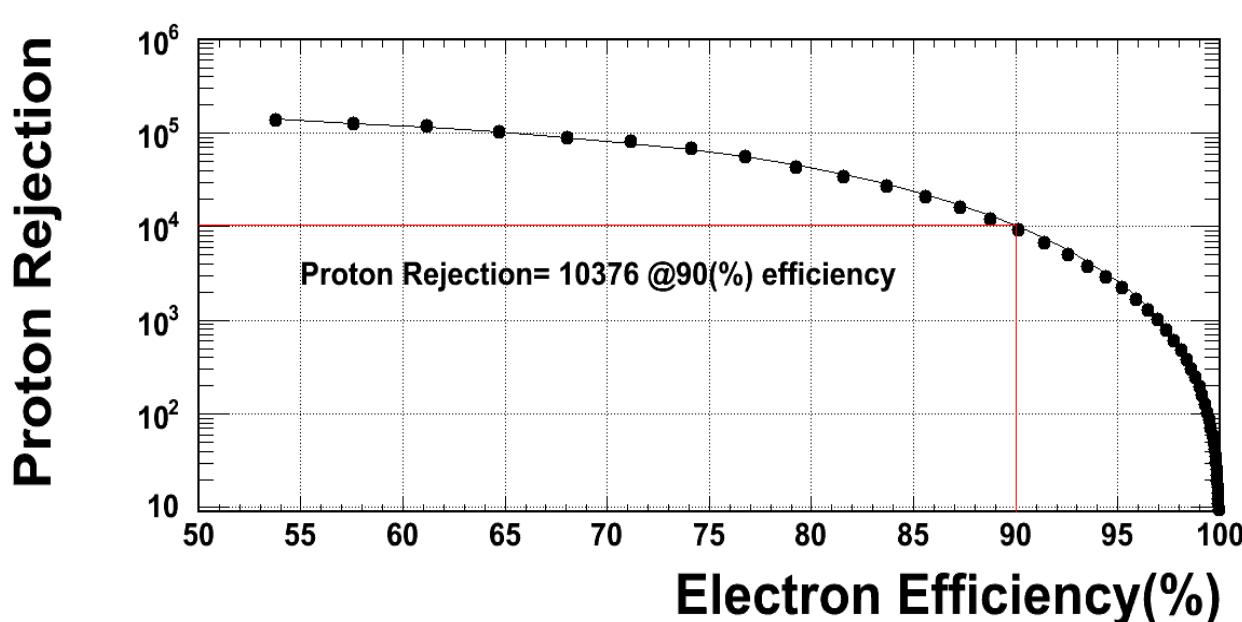
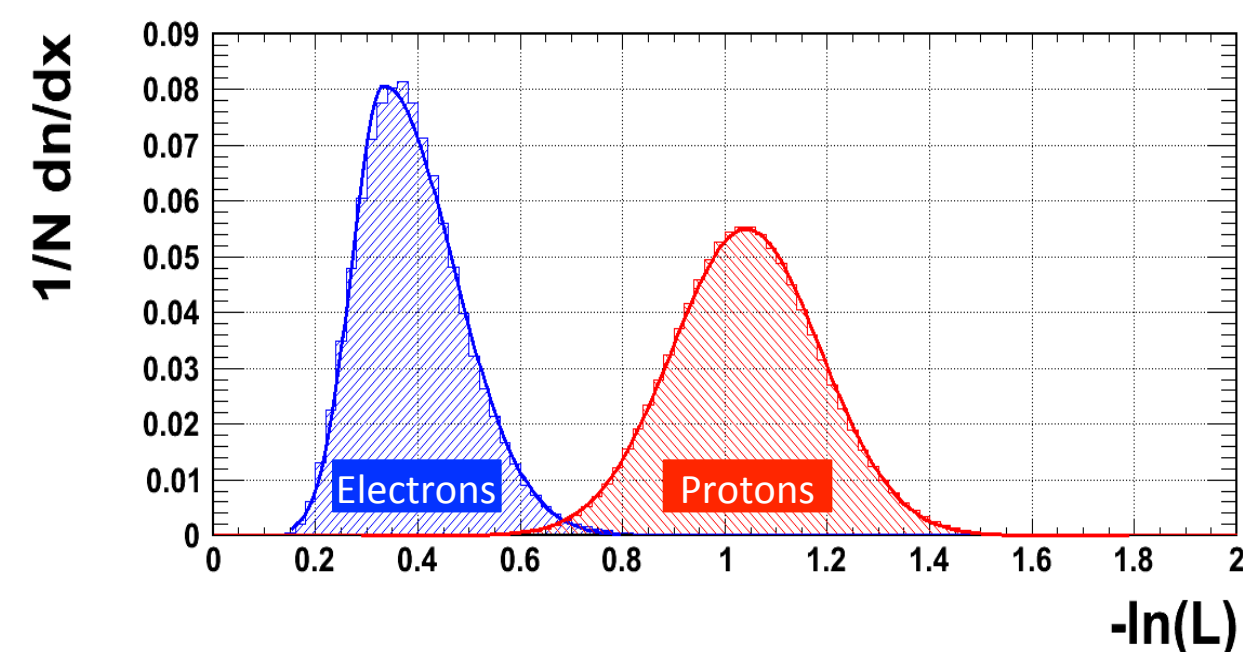
The AMS Tracker and EM Calorimeter can be used to define separate, clean Electron and Proton samples. This allows to study the TRD response in Space and determine the particle identification power from flight data directly!  
The different response at the single tube level is due to transition radiation.



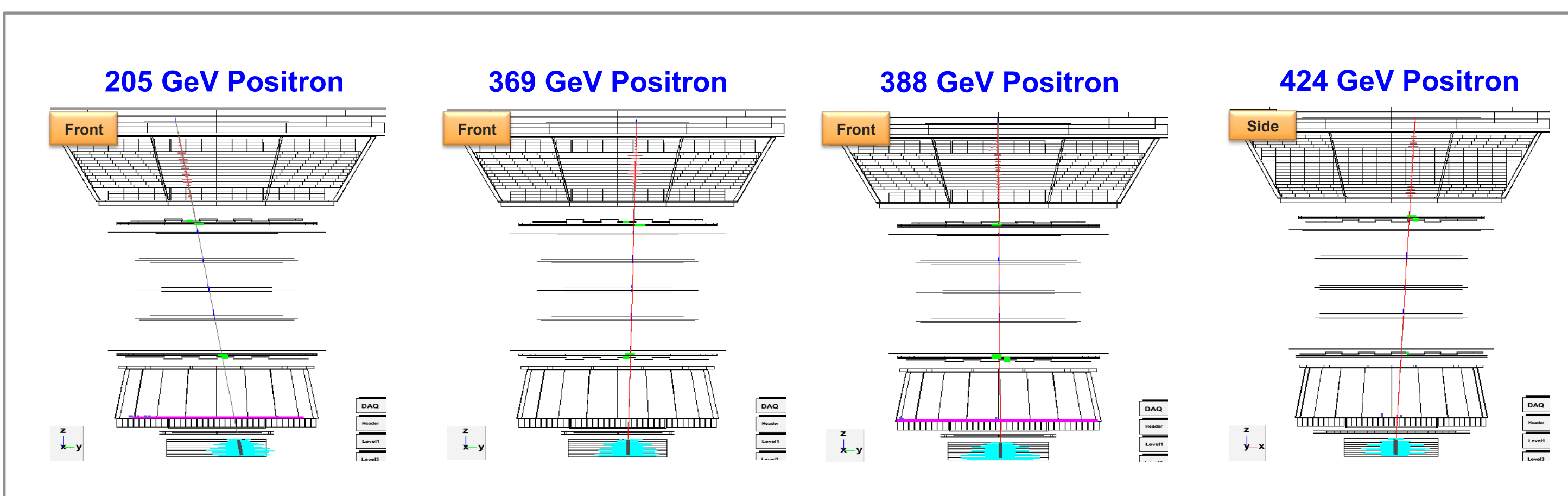
In the data analysis, the electron/proton separation is based on a likelihood method.

$$L = \frac{\bar{P}_e}{\bar{P}_p + \bar{P}_e}$$

$$\bar{P}_{e/p} = \sqrt[n]{\prod_i P_{e/p}^{(i)}(E)}$$



The rejection factor obtained ensures the AMS-02 capability to reach the desired sensitivity on the positron spectrum on the whole interesting energy range, even at very high energies.



Many high-energy events have already been collected!

