

Dark side of the Moon/Bright side of the Night - Moon Shadow observations with MAGIC

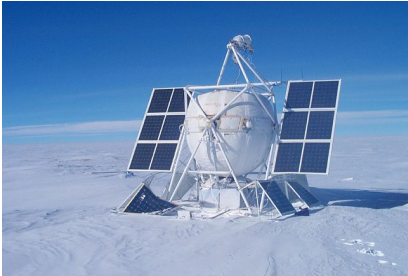
IMPRS YSW Ringberg



Marcel C. Strzys

MAGIC group

ATIC and PAMELA



[statocat]

- ▶ 2 flights 2000 and 2003



[Pamela collab.]

- ▶ launched 2006

ATIC and PAMELA



[statocat]

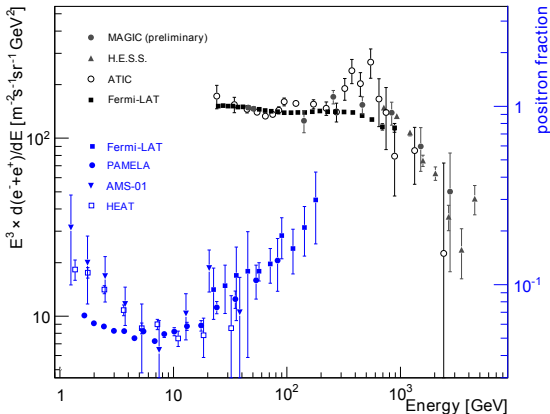
- ▶ 2 flights 2000 and 2003



[Pamela collab.]

- ▶ launched 2006

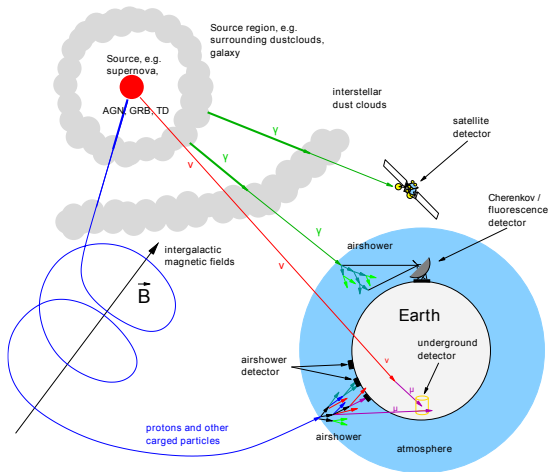
PAMELA results



[arxiv:1110.0183]

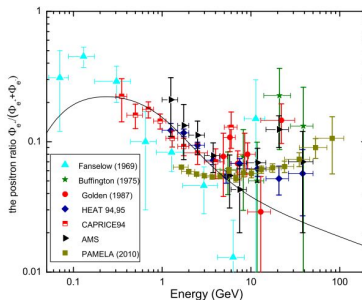
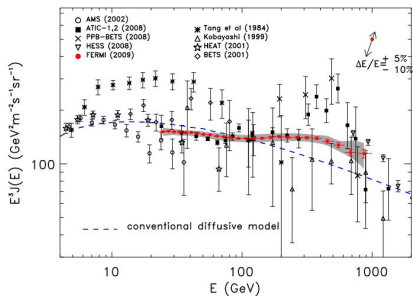
⇒ Cited 641 (ATIC peak) and 1274 (PAMELA pos. excess) times!

Difficulties with charged Particles



[Wagner2006]

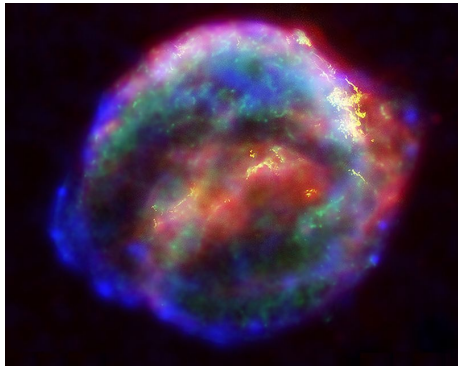
Disagreement Propagation \leftrightarrow Data



[arxiv:1008.4646]

Plenty of explanations

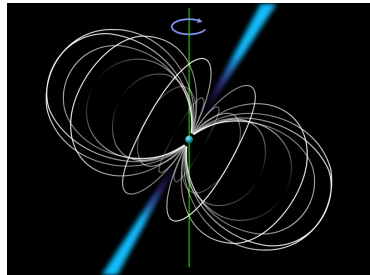
- ▶ Nearby sources
 - ▶ Supernova remnants



[Wikipedia]

Plenty of explanations

- ▶ Nearby sources
 - ▶ Supernova remnants
 - ▶ Pulsar wind nebulae



[Wikipedia]

Plenty of explanations

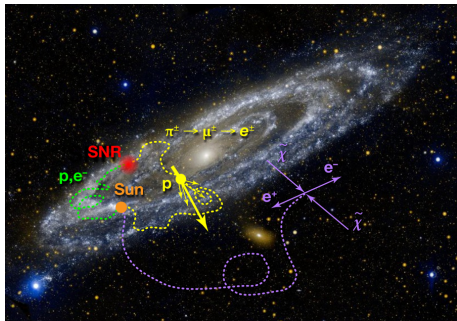
- ▶ Nearby sources
 - ▶ Supernova remnants
 - ▶ Pulsar wind nebulae
- ▶ Dark Matter decay/annihilation



[mhpstrong]

Plenty of explanations

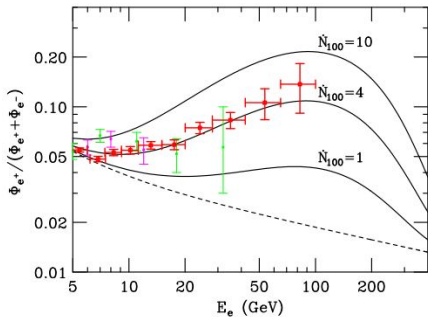
- ▶ Nearby sources
 - ▶ Supernova remnants
 - ▶ Pulsar wind nebulae
- ▶ Dark Matter decay/annihilation
- ▶ Propagation effects



[DOI:10.1103/Physics.6.40]

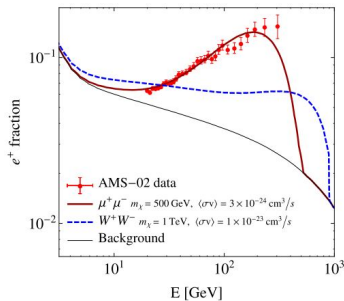
Model predictions

Pulsar Models



[arxiv:0810.1527]

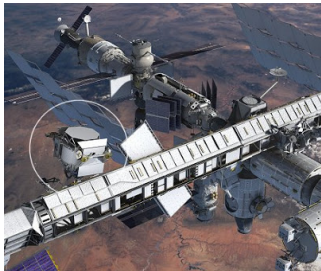
Dark Matter Annihilation



[arxiv:1304.1184]

Latest Status - AMS 2

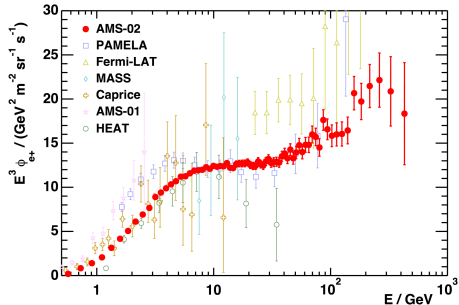
AMS 2 experiment



Costs: \approx 2 billion \$

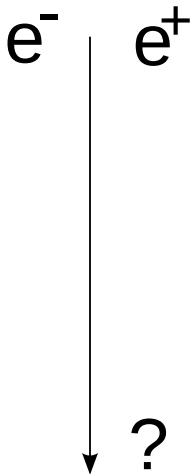
AMS 2 also searches for $\bar{C} \rightarrow 1$ atom
proofs ex. of anti-galaxies

Results July 2014

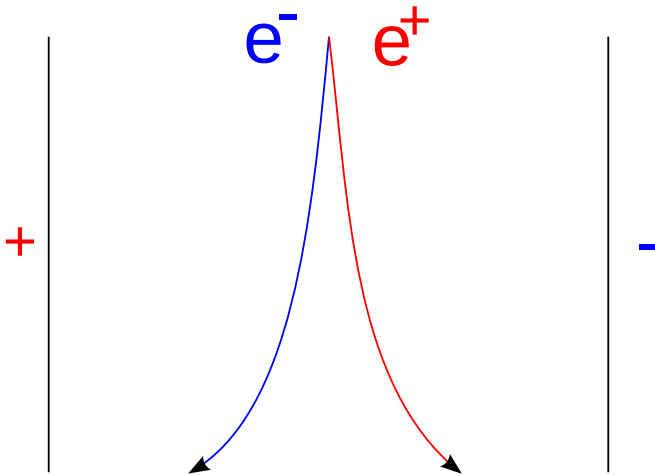


[BerdugoICHEP2014]

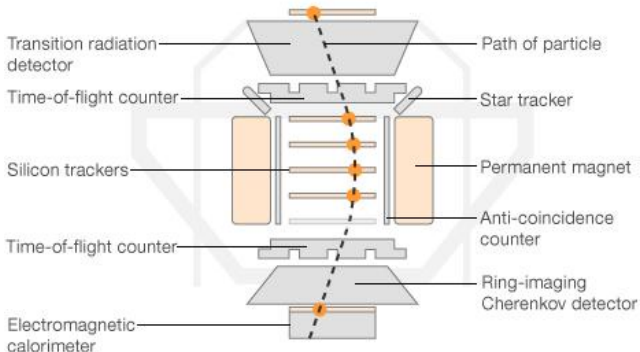
How to discriminate charged particles



How to discriminate charged particles



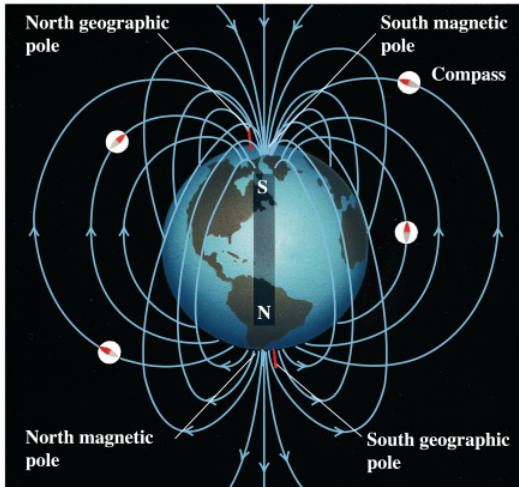
How to discriminate charged particles



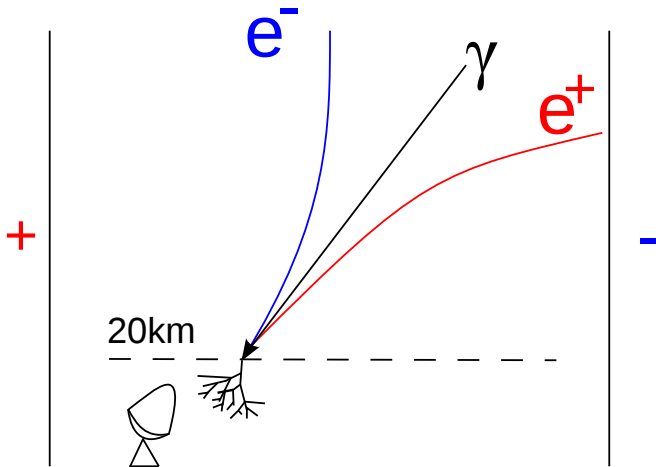
Source: CERN

[CERN]

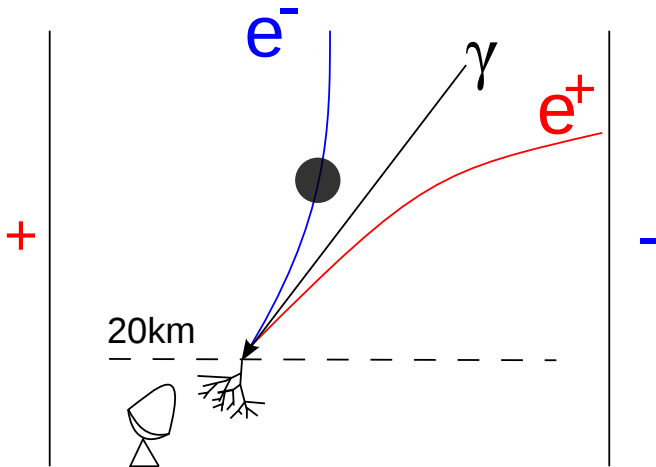
How to discriminate charged particles



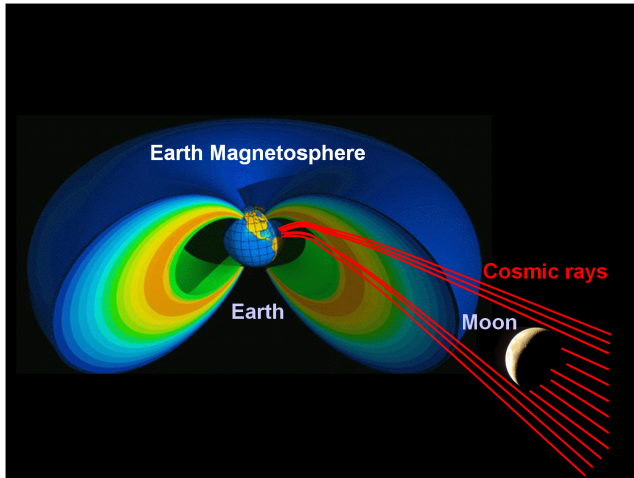
How to discriminate charged particles



How to discriminate charged particles

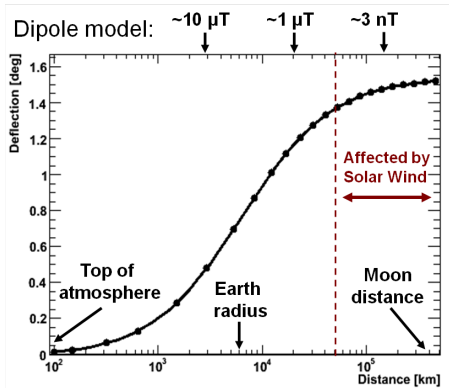


How to discriminate charged particles

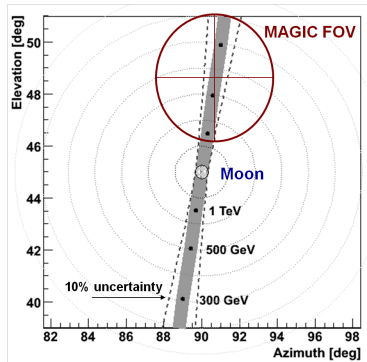


Deflection by magnetic field

Deflection 1 TeV electron

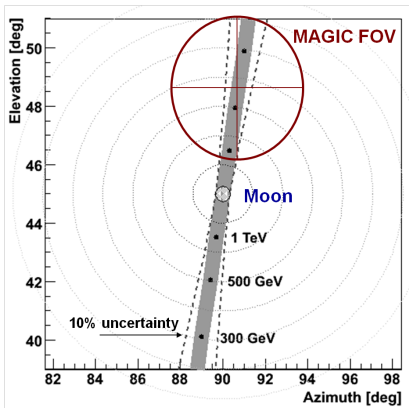


Observation scenario

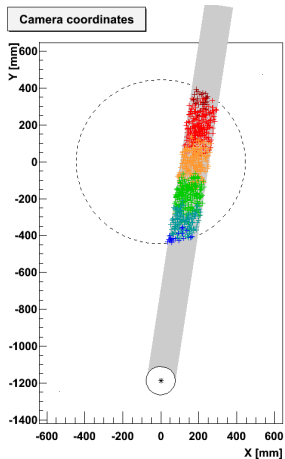


Deflection by magnetic field

Observation scenario



Toy MC



The Moon - a spotlight in the night

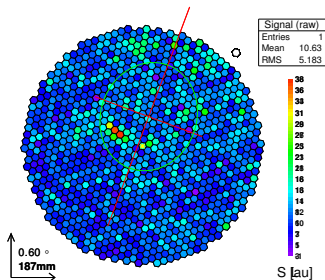
Magnitude

- ▶ Full Moon has a magnitude of -12.5
- ▶ Sun -26.5, Vega 0
- ▶ 1 mag more $\hat{=}$ 60% less intense
- ▶ > 4 mag star gets visible in the camera

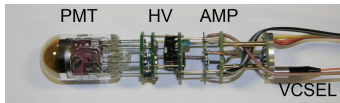
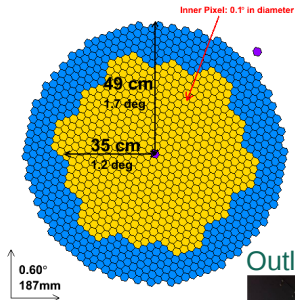


Changes compared to norm. Observations

Higher Noise level



Higher Discriminator threshold



Reduced HV

Outlook: Filter





Thank you for your attention and interest!