The DAMPE Space Mission

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on behalf of DAMPE collaboration
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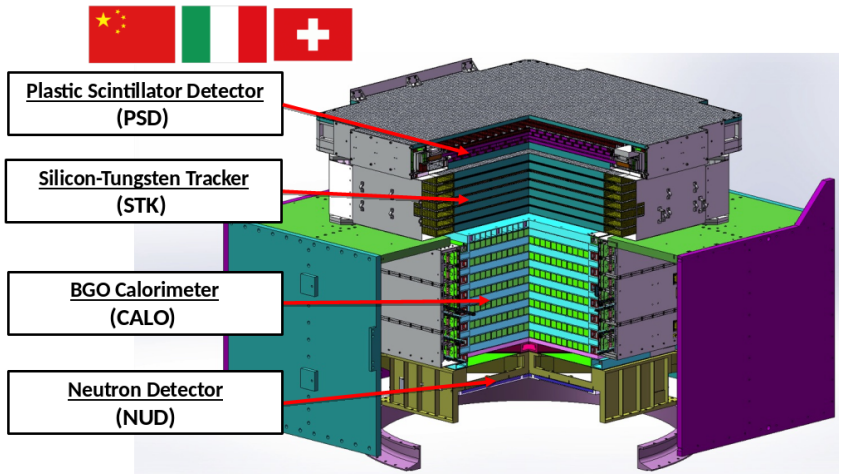
Physics goals and The Detector

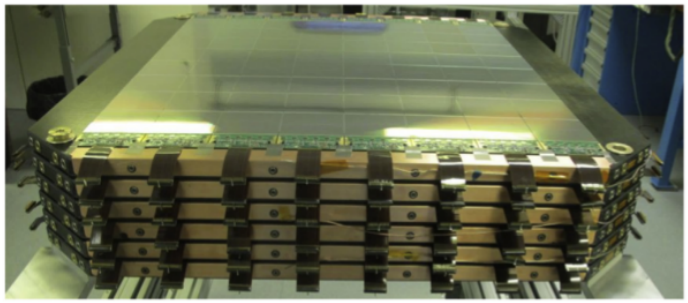


- Study of the cosmic electron and photon spectra
- Study of the cosmic ray protons and heavier nuclei: spectrum and composition
- High energy gamma ray astronomy
- Search for Dark Matter signature in lepton spectra
- Energy range: 5 $GeV - 10$ TeV for γ and $e^{\pm}$; 50 $GeV - 500$ TeV for protons and nuclei

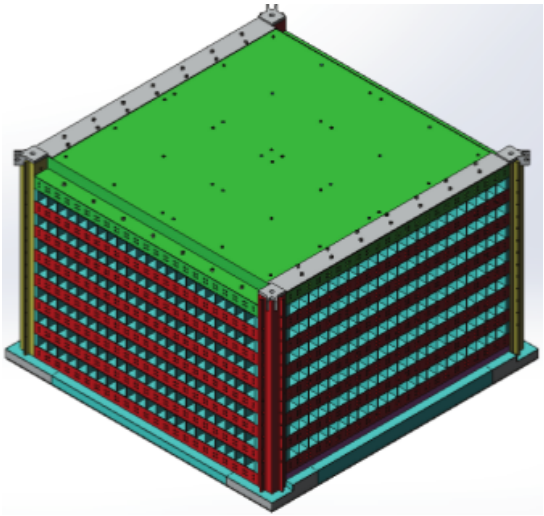
- Acceptance: ~ 0.3 $m^2 sr$
- Charge measurement (dE/dx in PSD, STK and BGO)
- Tungsten converter (pair prod.)

- Precise tracking (*Strip Si*)
- Deep Calorimeter (BGO bars)
- Hadron rejection (NUD)

Silicon-Tungsten Tracker (STK) and Calorimeter BGO



The STK is composed of 12 Silicon strip layers (6 for the x-coord., 6 for the y-coord.). The spatial resolution is $\sim$ 50 μm, and the analog readout provides an indipendent measurement of the incident particle charge.



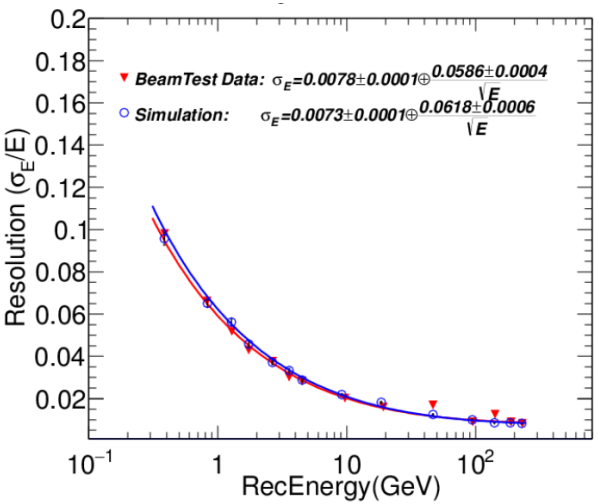
The BGOcal (60 $cm \times$ 60cm $\times$35 cm) is composed of 14 layers (7 for the x-coord., 7 for the y-coord.), and it is $\sim 32\ X_0$ deep.This depth ensures that almost 100% of the energy of $e^{\pm}$ and γ is deposited in the calorimeter ($\sim$ 40% for hadr.). Each crystal is read out by 2 PMTs, mounted on both of its ends. In order to cover a large dynamic range (2×10^6), the signals are collected from 3 different dynodes

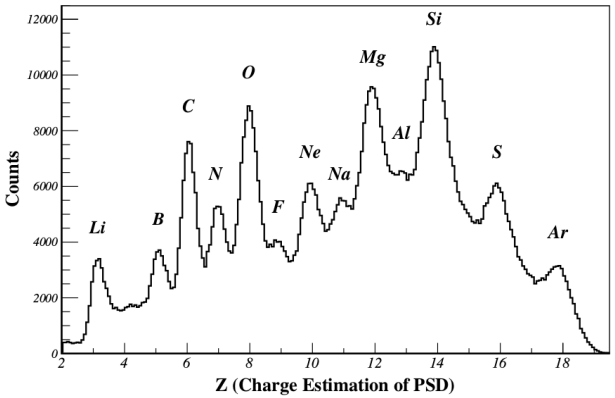
Test beam activity at CERN

October-November 2014 and April-November 2015 at PS and SPS:

- e^- from 0.5 *GeV* to 250 *GeV*
- p from 3.5 *GeV* to 400 *GeV*
- γ from 0.5 *GeV* to 150 *GeV*
- π from 3.5 *GeV* to 10 *GeV*
- Argon from 30*A GeV* to 75*A GeV*
- Nuclear fragments up to 170 *GeV*

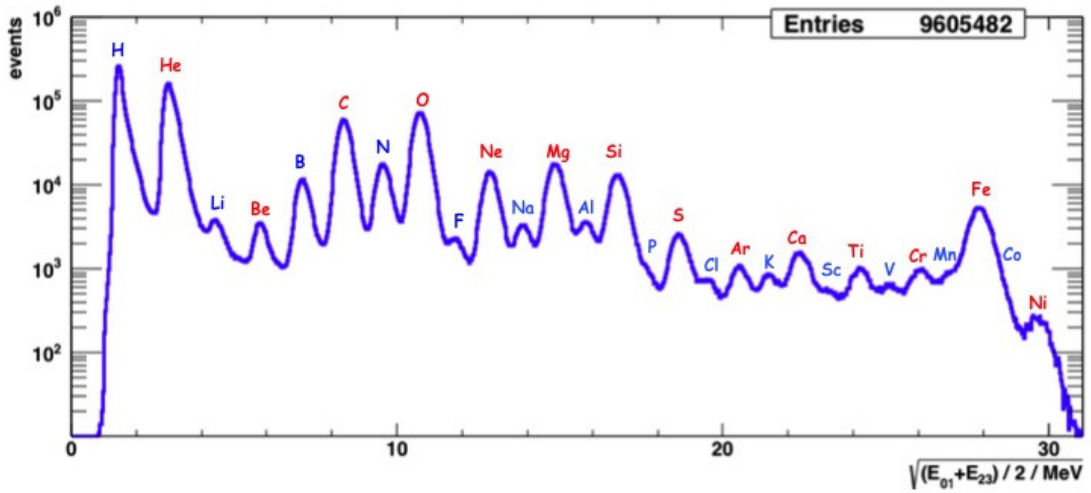
In order to test detector's performances and to check energy resolution, linearity, response to nuclei and so on.



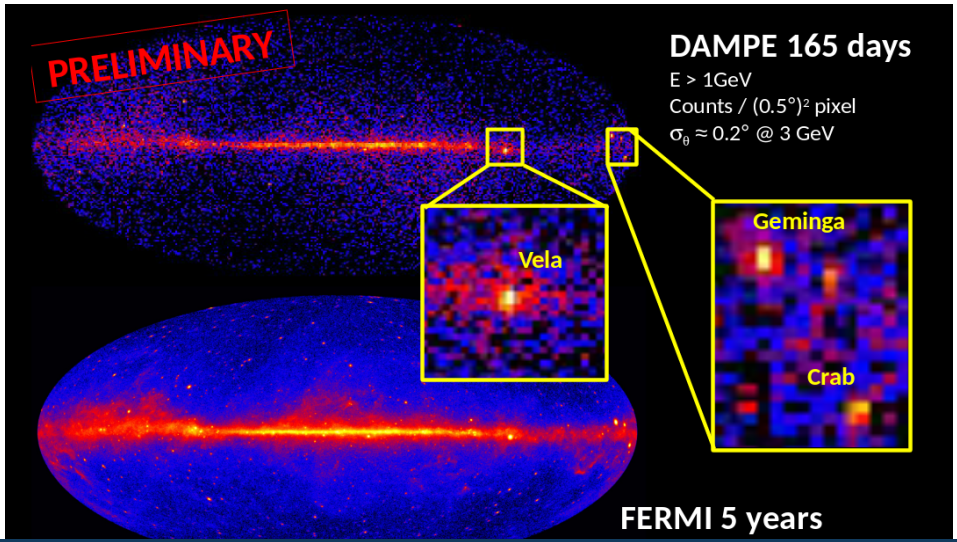


On orbit performances and preliminary results

The satellite is on a solar-synchronus orbit lasting 95 minutes, and it has an average trigger rate of about 60 *Hz* (several trigger tails, prescaling, etc..)

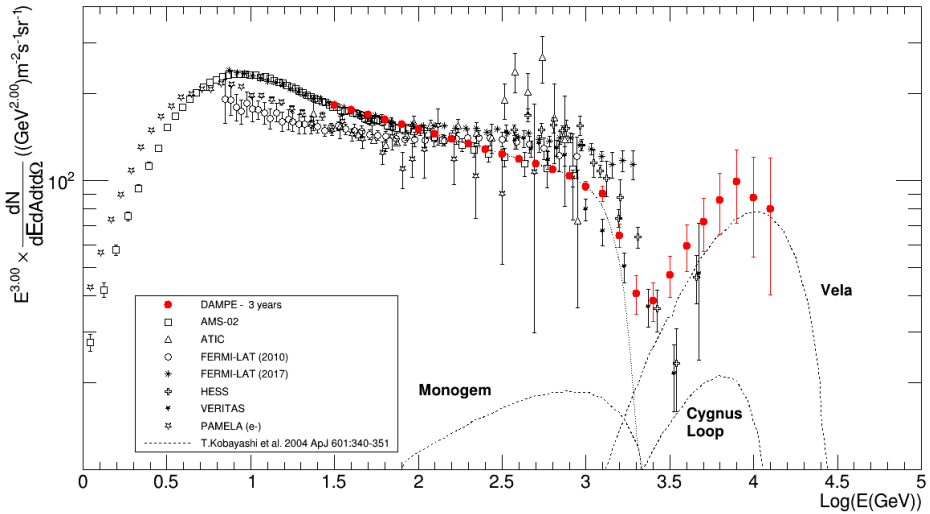


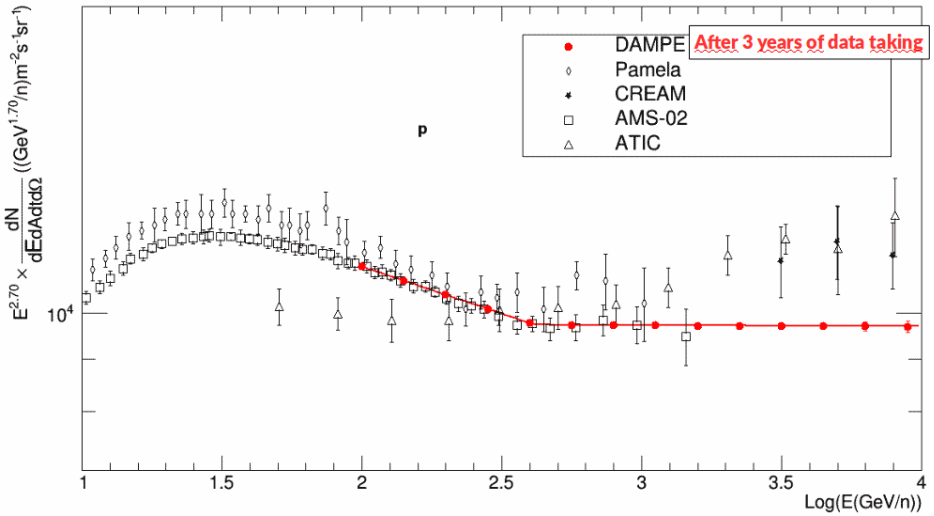
8 months of data taking (1 March - 31 October 2016)



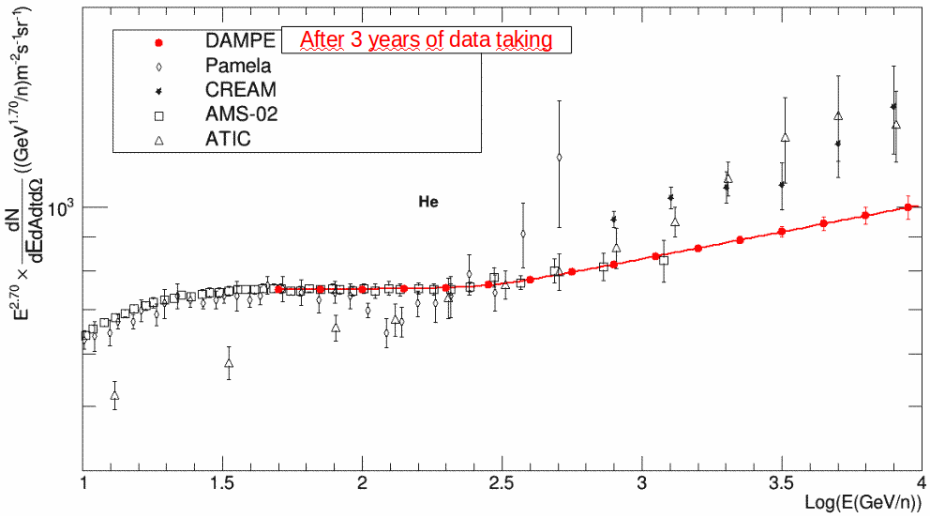
Sky map after $\sim$ 6 months

Expected performances





Thanks to geometrical acceptance, energetic resolution and wide energetic range we can observe possible strucure in the electron spectrum (like a cut-of in TeV region, or bump due to nearby sources), and a possible hardening in the protons and heavier nuclei spectra (around 300 GeV/n).



Simulation assuming AMS-02 fit