Summary of Japan M&S Group Activities

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for the Japan M&S group

Status of A/I in 2014-10-17 TIM

- A/I: Preparation of benchmark data sets for particle tracking:
  - A summary (an Excel file under caletgs2:~yosui/Dist) of the simulation data sets was updated (Y.Akaike).

CAL CAD model revision

(M&S Telecon on March 30, 2015)

- CAL CAD model Rev.18 with Cosmos7.645 and Epics9.163 or later (Y.Akaike).
- Updates of the repository of CALET_EPICS in SVN (rev. 18->21). The detector configuration is not changed. The updates are in source codes（Y.Akaike).
  - rev.19: Application of quenching effect to secondary particles
  - rev.20: Update of a conversion program of EPICS raw data to UnifiedOutput_v1.0
  - rev.21: Adding information of elastic collision and stop position of an incident particle
- CAD STEP files of the entire CALET with reduction will be available.

On-orbit simulation

- Solar Array Panels

  We continue the requirement for just rough information of materials of the solar array panels (e.g. frames, hinges) of the ISS.

Instrument performance

- Upgrade of Application of a Mahalanobis-Taguchi method for e/p separation will be presented in this TIM (K.Yoshida).
- Electron tracking using a Kalman filter technique will be presented in this TIM (K.Yoshida).
- Gamma-ray tracking procedure, background particle rejection, and Point Spread Function for gamma-ray observations are under investigation (T.Niita, Y.Akaike).
- FEC response
  - Y.Shimizu will start by considering how to share the program and present the parameters.

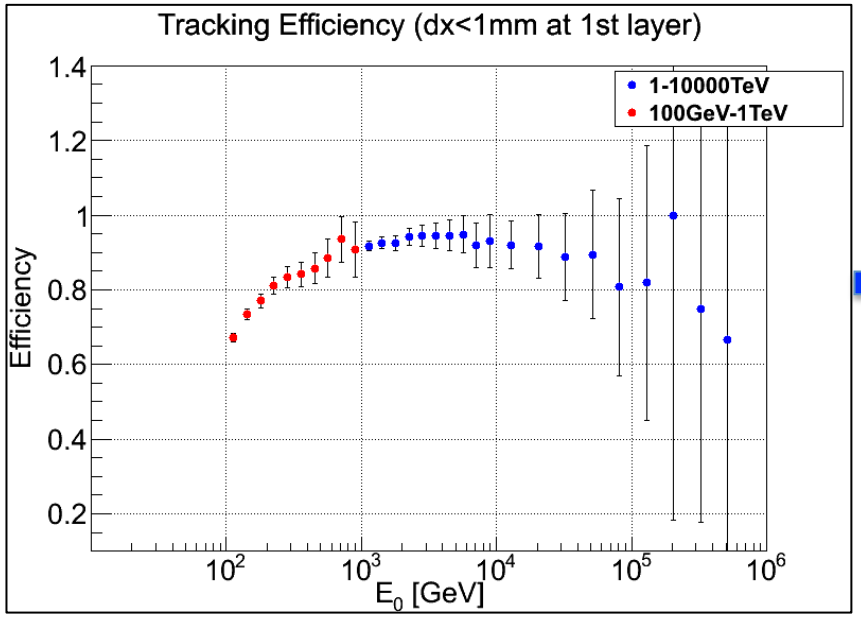
Instrument Performance: Improvement of Proton tracking (M.Ichimura)

(M&S Telecon on March 30, 2015)

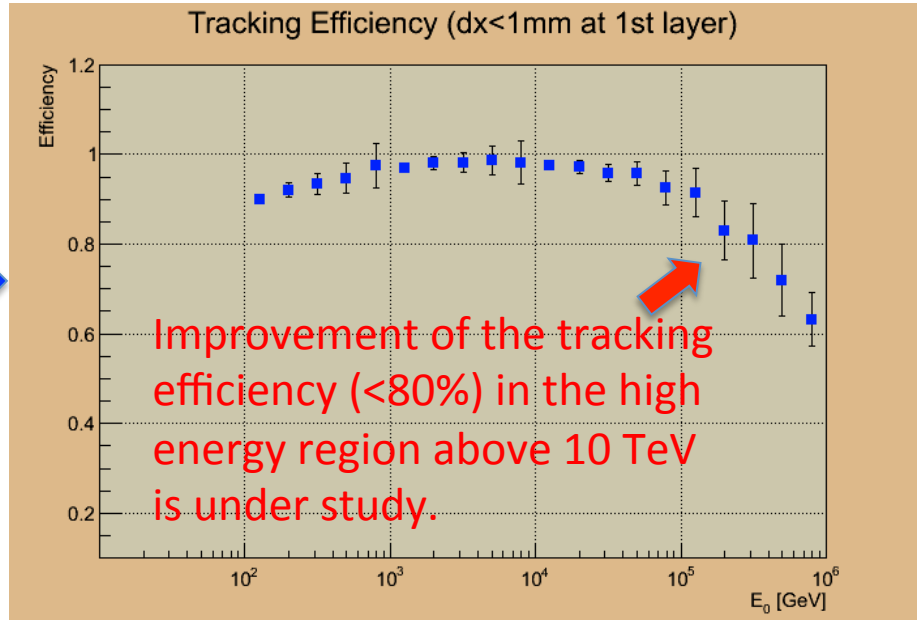
Tracking efficiency of protons with

- Angular resolution: 0.18 deg (width of 68%)
- Position resolution: 0.26mm at IMC Top layer

TIM version (0ct. 15, 2014)



Revised version



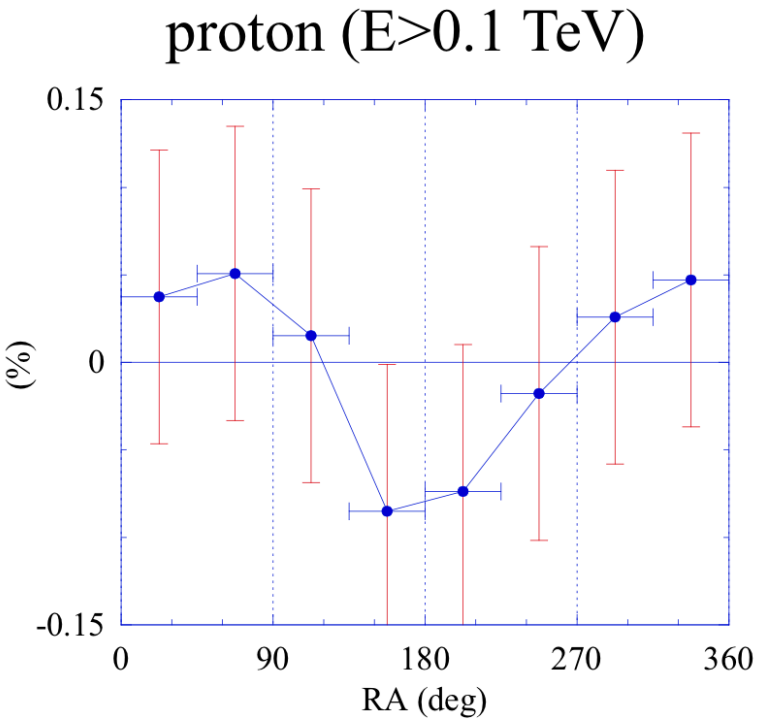
Observation performance

- Development of a conversion program from CALET Level-1 format to FITS format by using C++ with CCFits library (M.Mori)
  - A conversion program of the Level-2 format to FITS format will be developed after the agreement of the Level-2 format (M.Mori).
- Study of electron+positron and gamma-ray observations from Kaluza-Klein dark matter will be presented in this TIM by M.Mori.

Observation Performance: Sidereal anisotropy and count rate estimation (K.Munakata)

(M&S Telecon on March 30, 2015)

E (TeV)	proton (>E)			
	flux (/(m^2*sr*s)	c/5y	c/5y/45deg RA	err (%)
1	1.00E-02	3.78E+04	4.73E+03	1.45E+00
0.5	1.00E-01	3.78E+05	4.73E+04	4.60E-01
0.1	3.00E+00	1.14E+07	1.42E+06	8.39E-02



Detection of proton anisotropy is possible with 2 sigma level

Observation Performance:
The Solar Modulation (11yr variation) of GCR protons (S.Miyake)

Our study

- Solar modulation of Galactic cosmic rays
- Numerical simulation using the stochastic method
- Observed parameters (V_{sw}, B_{1AU}, α) have been assumed

Present Results

- The amplitude of energy spectrums are consistent with the observations obtained by BESS and PAMELA.
- The charge dependence of the flux is reproduced.
- The integral flux during cycle 24/25 will be 30% higher than the flux during cycle 22/23.