

**Properties of Cosmic Helium Isotopes Measured by the Alpha
Magnetic Spectrometer
- SUPPLEMENTAL MATERIAL -**

(The AMS Collaboration)

For references see the main text.

Detector.– The layout and description of the AMS detector are presented in Ref. [14]. The key elements used in this measurement are the permanent magnet [15], the silicon tracker, the four planes of time of flight scintillation counters (TOF), and the ring imaging Čerenkov detector (RICH). AMS also contains a transition radiation detector (TRD), an electromagnetic calorimeter (ECAL), and an array of 16 anticoincidence counters.

The tracker measures the momentum divided by charge, or rigidity R , of charged cosmic rays deflected in the magnetic field. The tracker [16] has nine layers, the first (L1) at the top of the detector, the second (L2) above the magnet, six (L3 to L8) within the bore of the magnet, and the last (L9) above the ECAL. L2 to L8 constitute the inner tracker. The spatial resolution in each tracker layer is $6.5\ \mu\text{m}$ in the bending direction for helium. The resolution of the rigidity measurement for helium is better than 10% below 20 GV and the maximum detectable rigidity (MDR) is 3.2 TV [8]. Each layer of the tracker provides an independent measurement of the charge magnitude Z . Overall, the inner tracker charge resolution is $\Delta Z = 0.07$ for $Z = 2$ nuclei.

Two planes of TOF counters [17] are located above and two planes are below the magnet. The TOF velocity ($\beta = v/c$) resolution has been measured to be $\Delta(1/\beta) = 0.02$ for $Z = 2$ particles. The pulse heights of the two upper TOF planes are combined to provide an independent measurement of the charge with an accuracy $\Delta Z = 0.08$ for $Z = 2$. The pulse heights from the two lower TOF planes are combined to provide an additional charge measurement with the same accuracy.

The RICH detector [18] measures the particle velocity and charge magnitude. It is located below the lower TOF and consists of two radiators, an expansion volume, and a photo-detection plane. The dielectric radiators induce the emission of a cone of Čerenkov photons when traversed by charged particles with a velocity greater than the velocity of light in the radiator. The central radiator is formed by sodium fluoride (RICH-NaF) of refractive index $n = 1.33$, it is surrounded by silica aerogel (RICH-Agl) of refractive index $n = 1.05$. This allows the detection of particles with velocities $\beta > 0.75$ for those which pass through the NaF radiator and $\beta > 0.953$ for those which pass through the Agl radiator. The expansion volume extends along z for 470 mm between the radiators and the photo-detection plane and it is surrounded by a high reflectivity mirror to increase detection efficiency. The photo-detection plane is an array of 10880 photosensors in multi-channel photomultiplier tubes with an effective spatial granularity of $8.5 \times 8.5\ \text{mm}^2$. For $Z = 2$ nuclei, the RICH velocity resolution $\Delta\beta$ is 25×10^{-4} for NaF and 7×10^{-4} for Agl. The RICH independently measures the nuclei charge by counting the number of Čerenkov photons with an accuracy for $Z = 2$ of $\Delta Z = 0.6$ for NaF and $\Delta Z = 0.3$ for Agl.

Helium nuclei traversing AMS are triggered as described in Ref. [8], with measured efficiencies $> 94\%$.

Monte Carlo (MC) simulated events were produced using a dedicated program developed by the collaboration based on the GEANT4 10.3 package [19]. The program simulates electromagnetic and hadronic interactions of particles in the material of the AMS and generates detector responses. The INCL++ package [20] was used to model helium-nuclear inelastic interactions below 5 GeV/n and the DPMJET-II.5 package [21] was used at higher energies. The helium-nuclear elastic and quasi-elastic scattering were modelled using the measurements from Ref. [8]. The helium-nuclear interactions with the materials in the AMS have been corrected accordingly to the results in Ref. [8]. The interaction cross sections of ^3He on AMS materials have been accounted following the measurements in Ref. [22].

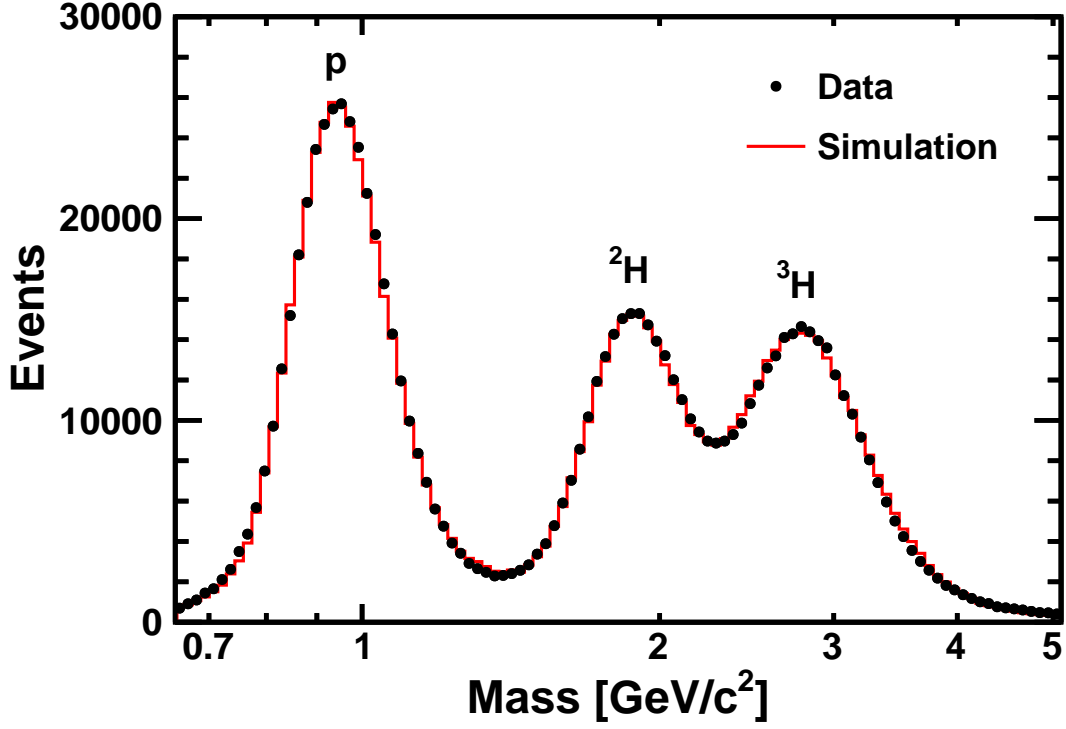


FIG. S1. Mass distribution for events interacting between tracker L1 and L2 with $0.9721 < \beta < 0.9954$. The events were selected by requiring a measured charge of $Z = 2$ in tracker L1, and charge $Z = 1$ in the inner tracker (L2 to L8). The rigidity R is measured with the inner tracker. The velocity β is measured with RICH-Agl. The MC simulation (red histogram) is normalized to the total number of events in the data (black points). Peaks corresponding to proton, deuterium (^2H), and tritium (^3H) nuclei produced from interactions of He with AMS materials are clearly visible. The data and the MC simulation agree well.

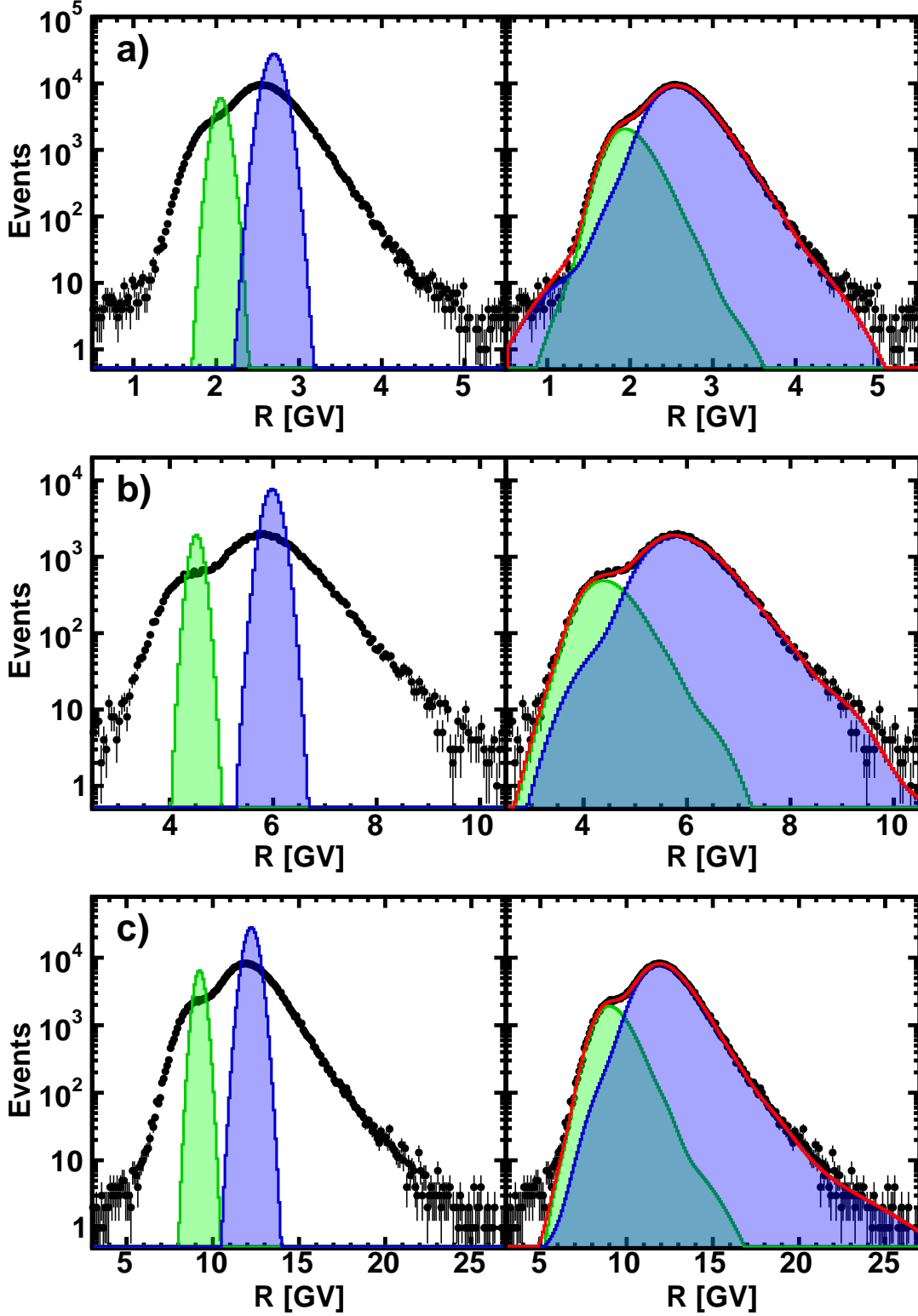


FIG. S2. The rigidity distributions for He data (black points) and for ^3He (green shaded area) and ^4He (blue shaded area) after unfolding (left) and folded (right) for three velocity intervals selected using (a) the TOF $0.8149 < \beta < 0.8160$, (b) the RICH-NaF $0.9532 < \beta < 0.9537$, and (c) the RICH-Agl $0.9863 < \beta < 0.9864$. The fits (red curves) are obtained by adding the folded ^3He and ^4He distributions with the rigidity resolution function and they yield $\chi^2/\text{d.o.f.}$ of (a) 137/136, (b) 126/124, and (c) 165/152.

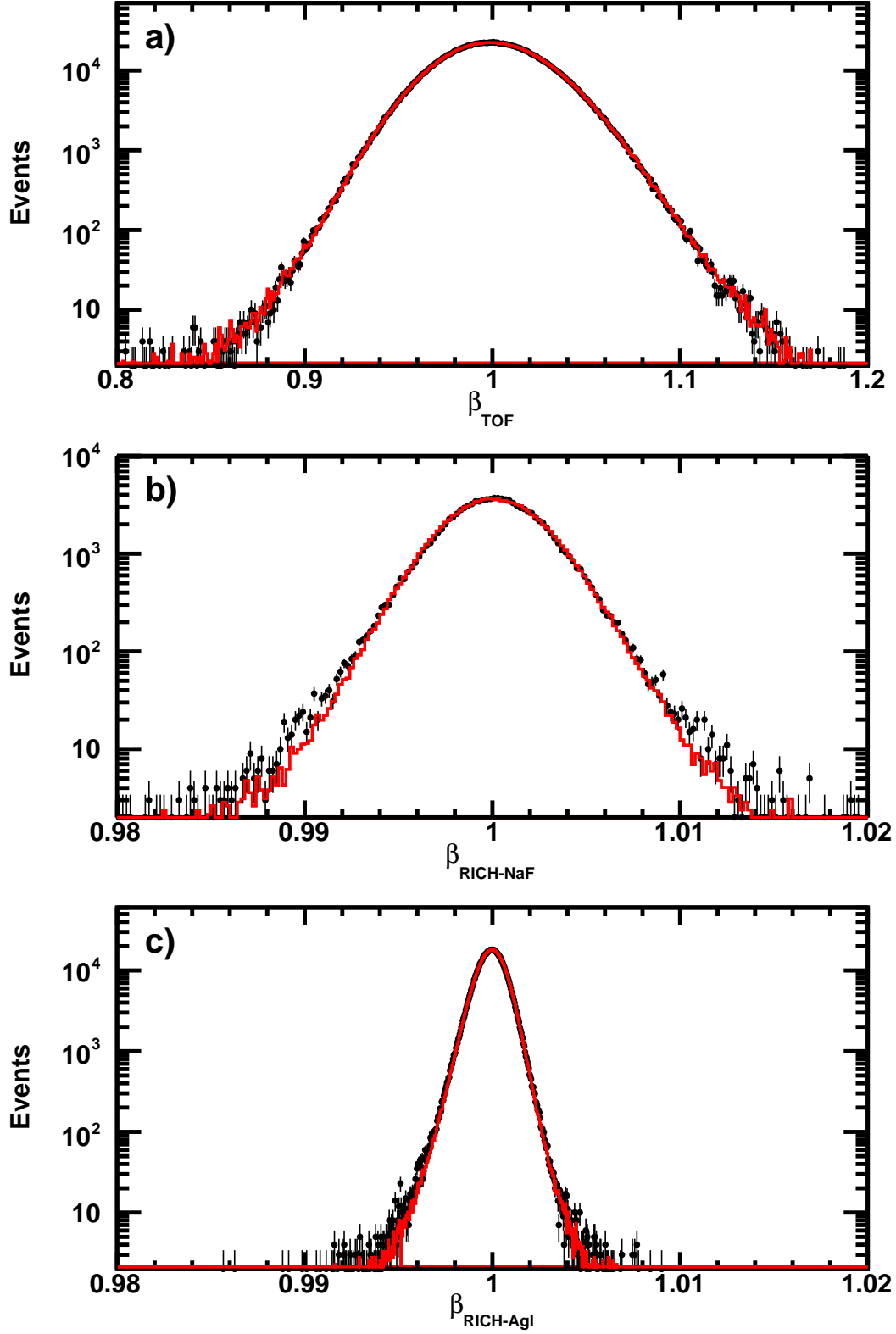


FIG. S3. Helium velocity resolution for $\beta = 1$ selected with $R > 100$ GV for (a) the TOF, (b) the RICH-NaF, and (c) the RICH-Agl, for data (black points) and the MC simulation (red histogram). The velocity resolution is $\Delta(1/\beta) = 0.02$ for the TOF, $\Delta\beta = 25 \times 10^{-4}$ for the RICH-NaF, and $\Delta\beta = 7 \times 10^{-4}$ for RICH-Agl.

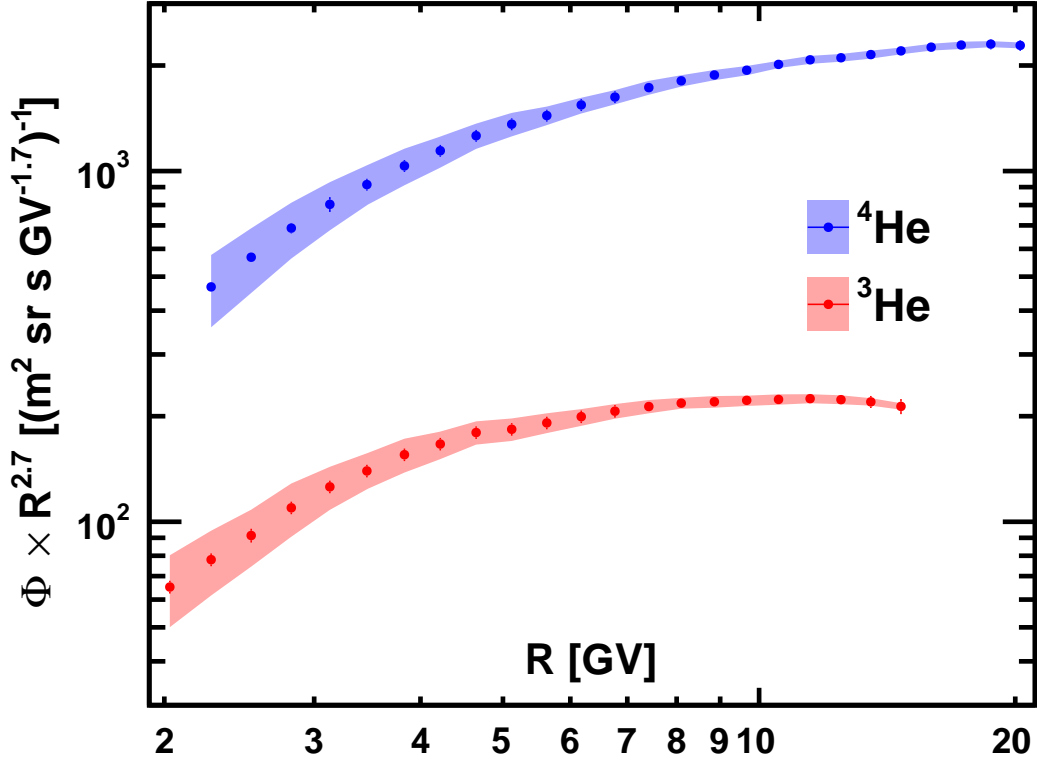


FIG. S4. The AMS time-averaged ${}^3\text{He}$ (red points) and ${}^4\text{He}$ (blue points) fluxes multiplied by $R^{2.7}$, as functions of rigidity with total errors. The shaded regions show the range of the time variations.

TABLE SM I. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2426 to 2429 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.154 0.016 0.053) $\times 10^1$	– – –	– – –
2.15 – 2.40	(1.010 0.014 0.046) $\times 10^1$	(5.980 0.008 0.200) $\times 10^1$	(1.689 0.023 0.066) $\times 10^{-1}$
2.40 – 2.67	7.847 0.250 0.501	(5.310 0.007 0.184) $\times 10^1$	(1.478 0.047 0.067) $\times 10^{-1}$
2.67 – 2.97	7.155 0.214 0.437	(4.764 0.006 0.184) $\times 10^1$	(1.502 0.045 0.067) $\times 10^{-1}$
2.97 – 3.29	6.344 0.187 0.388	(4.152 0.005 0.216) $\times 10^1$	(1.528 0.045 0.091) $\times 10^{-1}$
3.29 – 3.64	5.149 0.149 0.315	(3.377 0.013 0.202) $\times 10^1$	(1.525 0.045 0.042) $\times 10^{-1}$
3.64 – 4.02	4.439 0.127 0.271	(2.826 0.011 0.169) $\times 10^1$	(1.571 0.045 0.043) $\times 10^{-1}$
4.02 – 4.43	3.693 0.105 0.226	(2.414 0.009 0.144) $\times 10^1$	(1.530 0.044 0.042) $\times 10^{-1}$
4.43 – 4.88	3.015 0.085 0.184	(2.014 0.007 0.120) $\times 10^1$	(1.497 0.042 0.041) $\times 10^{-1}$
4.88 – 5.37	2.351 0.066 0.144	(1.665 0.006 0.100) $\times 10^1$	(1.412 0.040 0.039) $\times 10^{-1}$
5.37 – 5.90	1.880 0.053 0.115	(1.398 0.005 0.084) $\times 10^1$	(1.344 0.038 0.037) $\times 10^{-1}$
5.90 – 6.47	1.517 0.044 0.093	(1.142 0.004 0.068) $\times 10^1$	(1.328 0.039 0.037) $\times 10^{-1}$
6.47 – 7.09	1.221 0.036 0.075	9.459 0.034 0.566	(1.291 0.039 0.036) $\times 10^{-1}$
7.09 – 7.76	(9.675 0.128 0.329) $\times 10^{-1}$	7.667 0.015 0.239	(1.262 0.017 0.033) $\times 10^{-1}$
7.76 – 8.48	(7.984 0.106 0.270) $\times 10^{-1}$	6.426 0.011 0.200	(1.242 0.017 0.032) $\times 10^{-1}$
8.48 – 9.26	(6.224 0.084 0.212) $\times 10^{-1}$	5.158 0.009 0.161	(1.207 0.016 0.032) $\times 10^{-1}$
9.26 – 10.10	(5.024 0.071 0.171) $\times 10^{-1}$	4.269 0.007 0.133	(1.177 0.017 0.031) $\times 10^{-1}$
10.10 – 11.00	(3.955 0.058 0.134) $\times 10^{-1}$	3.486 0.006 0.108	(1.135 0.017 0.030) $\times 10^{-1}$
11.00 – 12.00	(3.150 0.048 0.107) $\times 10^{-1}$	2.873 0.005 0.089	(1.096 0.017 0.028) $\times 10^{-1}$
12.00 – 13.00	(2.573 0.043 0.089) $\times 10^{-1}$	2.337 0.004 0.073	(1.101 0.019 0.030) $\times 10^{-1}$
13.00 – 14.10	(2.054 0.037 0.094) $\times 10^{-1}$	1.908 0.003 0.059	(1.077 0.019 0.048) $\times 10^{-1}$
14.10 – 15.30	(1.579 0.030 0.086) $\times 10^{-1}$	1.557 0.003 0.050	(1.014 0.020 0.059) $\times 10^{-1}$
15.30 – 16.60	– – –	1.280 0.002 0.044	– – –
16.60 – 18.00	– – –	1.054 0.002 0.040	– – –
18.00 – 19.50	– – –	(8.536 0.018 0.351) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.691 0.015 0.284) $\times 10^{-1}$	– – –

TABLE SM II. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2430 to 2433 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.056 0.013 0.047) $\times 10^1$	– – –	– – –
2.15 – 2.40	9.290 0.109 0.411	(5.621 0.007 0.177) $\times 10^1$	(1.653 0.019 0.064) $\times 10^{-1}$
2.40 – 2.67	7.859 0.219 0.461	(4.928 0.005 0.161) $\times 10^1$	(1.595 0.045 0.069) $\times 10^{-1}$
2.67 – 2.97	6.975 0.182 0.388	(4.381 0.004 0.162) $\times 10^1$	(1.592 0.042 0.067) $\times 10^{-1}$
2.97 – 3.29	6.416 0.165 0.357	(3.877 0.004 0.196) $\times 10^1$	(1.655 0.043 0.096) $\times 10^{-1}$
3.29 – 3.64	5.135 0.130 0.286	(3.436 0.012 0.186) $\times 10^1$	(1.495 0.038 0.041) $\times 10^{-1}$
3.64 – 4.02	4.543 0.114 0.253	(2.874 0.009 0.156) $\times 10^1$	(1.581 0.040 0.044) $\times 10^{-1}$
4.02 – 4.43	3.542 0.088 0.197	(2.471 0.008 0.134) $\times 10^1$	(1.433 0.036 0.040) $\times 10^{-1}$
4.43 – 4.88	3.032 0.075 0.169	(2.053 0.007 0.111) $\times 10^1$	(1.477 0.037 0.041) $\times 10^{-1}$
4.88 – 5.37	2.343 0.057 0.130	(1.748 0.006 0.095) $\times 10^1$	(1.341 0.033 0.037) $\times 10^{-1}$
5.37 – 5.90	1.880 0.047 0.105	(1.388 0.004 0.075) $\times 10^1$	(1.354 0.034 0.037) $\times 10^{-1}$
5.90 – 6.47	1.544 0.039 0.086	(1.186 0.004 0.064) $\times 10^1$	(1.302 0.033 0.036) $\times 10^{-1}$
6.47 – 7.09	1.263 0.033 0.070	9.642 0.030 0.523	(1.310 0.034 0.036) $\times 10^{-1}$
7.09 – 7.76	1.010 0.012 0.033	7.929 0.014 0.235	(1.273 0.015 0.033) $\times 10^{-1}$
7.76 – 8.48	(7.878 0.092 0.256) $\times 10^{-1}$	6.607 0.010 0.196	(1.192 0.014 0.031) $\times 10^{-1}$
8.48 – 9.26	(6.330 0.075 0.207) $\times 10^{-1}$	5.418 0.008 0.161	(1.168 0.014 0.031) $\times 10^{-1}$
9.26 – 10.10	(5.123 0.063 0.167) $\times 10^{-1}$	4.392 0.006 0.130	(1.167 0.015 0.031) $\times 10^{-1}$
10.10 – 11.00	(3.993 0.051 0.130) $\times 10^{-1}$	3.564 0.005 0.106	(1.121 0.015 0.029) $\times 10^{-1}$
11.00 – 12.00	(3.219 0.043 0.105) $\times 10^{-1}$	2.948 0.004 0.087	(1.092 0.015 0.028) $\times 10^{-1}$
12.00 – 13.00	(2.593 0.038 0.086) $\times 10^{-1}$	2.410 0.004 0.071	(1.076 0.016 0.029) $\times 10^{-1}$
13.00 – 14.10	(2.029 0.032 0.090) $\times 10^{-1}$	1.987 0.003 0.059	(1.022 0.016 0.045) $\times 10^{-1}$
14.10 – 15.30	(1.564 0.026 0.084) $\times 10^{-1}$	1.591 0.003 0.049	(9.832 0.166 0.570) $\times 10^{-2}$
15.30 – 16.60	– – –	1.340 0.002 0.045	– – –
16.60 – 18.00	– – –	1.077 0.002 0.039	– – –
18.00 – 19.50	– – –	(8.607 0.016 0.344) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.821 0.014 0.282) $\times 10^{-1}$	– – –

TABLE SM III. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2434 to 2437 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.043 0.013 0.046) $\times 10^1$	– – –	– – –
2.15 – 2.40	9.172 0.112 0.408	(5.614 0.007 0.178) $\times 10^1$	(1.634 0.020 0.064) $\times 10^{-1}$
2.40 – 2.67	7.562 0.220 0.477	(4.892 0.006 0.161) $\times 10^1$	(1.546 0.045 0.071) $\times 10^{-1}$
2.67 – 2.97	7.072 0.192 0.426	(4.367 0.005 0.162) $\times 10^1$	(1.619 0.044 0.073) $\times 10^{-1}$
2.97 – 3.29	6.183 0.165 0.373	(3.803 0.004 0.193) $\times 10^1$	(1.626 0.044 0.098) $\times 10^{-1}$
3.29 – 3.64	5.194 0.136 0.313	(3.199 0.011 0.189) $\times 10^1$	(1.624 0.043 0.045) $\times 10^{-1}$
3.64 – 4.02	4.097 0.107 0.247	(2.847 0.010 0.168) $\times 10^1$	(1.439 0.038 0.040) $\times 10^{-1}$
4.02 – 4.43	3.568 0.092 0.215	(2.449 0.008 0.144) $\times 10^1$	(1.457 0.038 0.040) $\times 10^{-1}$
4.43 – 4.88	2.955 0.075 0.178	(2.047 0.007 0.121) $\times 10^1$	(1.444 0.037 0.040) $\times 10^{-1}$
4.88 – 5.37	2.340 0.059 0.141	(1.632 0.005 0.096) $\times 10^1$	(1.434 0.036 0.040) $\times 10^{-1}$
5.37 – 5.90	1.912 0.048 0.115	(1.370 0.004 0.081) $\times 10^1$	(1.395 0.036 0.039) $\times 10^{-1}$
5.90 – 6.47	1.505 0.039 0.091	(1.132 0.004 0.067) $\times 10^1$	(1.330 0.035 0.037) $\times 10^{-1}$
6.47 – 7.09	1.243 0.033 0.075	9.381 0.030 0.553	(1.325 0.035 0.037) $\times 10^{-1}$
7.09 – 7.76	(9.773 0.115 0.333) $\times 10^{-1}$	7.952 0.014 0.248	(1.229 0.015 0.032) $\times 10^{-1}$
7.76 – 8.48	(7.862 0.093 0.266) $\times 10^{-1}$	6.423 0.010 0.200	(1.224 0.015 0.032) $\times 10^{-1}$
8.48 – 9.26	(6.188 0.075 0.211) $\times 10^{-1}$	5.219 0.008 0.163	(1.186 0.015 0.031) $\times 10^{-1}$
9.26 – 10.10	(4.924 0.062 0.168) $\times 10^{-1}$	4.287 0.006 0.134	(1.149 0.015 0.030) $\times 10^{-1}$
10.10 – 11.00	(3.981 0.053 0.135) $\times 10^{-1}$	3.525 0.005 0.110	(1.130 0.015 0.029) $\times 10^{-1}$
11.00 – 12.00	(3.126 0.043 0.106) $\times 10^{-1}$	2.891 0.004 0.090	(1.081 0.015 0.028) $\times 10^{-1}$
12.00 – 13.00	(2.483 0.038 0.086) $\times 10^{-1}$	2.333 0.004 0.073	(1.064 0.016 0.029) $\times 10^{-1}$
13.00 – 14.10	(1.984 0.032 0.090) $\times 10^{-1}$	1.950 0.003 0.061	(1.017 0.016 0.045) $\times 10^{-1}$
14.10 – 15.30	(1.561 0.027 0.085) $\times 10^{-1}$	1.585 0.003 0.051	(9.850 0.171 0.571) $\times 10^{-2}$
15.30 – 16.60	– – –	1.285 0.002 0.044	– – –
16.60 – 18.00	– – –	1.060 0.002 0.040	– – –
18.00 – 19.50	– – –	(8.557 0.016 0.352) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.876 0.014 0.292) $\times 10^{-1}$	– – –

TABLE SM IV. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2438 to 2441 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{{}^3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{{}^4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{{}^3\text{He}}/\Phi_{{}^4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	9.707	0.123	0.442	–	–	–	–	–	–
2.15 – 2.40	8.556	0.105	0.389	(5.116 0.006 0.170)	$\times 10^1$	(1.672 0.021 0.065)	$\times 10^{-1}$		
2.40 – 2.67	7.309	0.213	0.443	(4.532 0.005 0.155)	$\times 10^1$	(1.613 0.047 0.070)	$\times 10^{-1}$		
2.67 – 2.97	6.710	0.183	0.387	(4.144 0.004 0.159)	$\times 10^1$	(1.619 0.044 0.069)	$\times 10^{-1}$		
2.97 – 3.29	5.946	0.158	0.343	(3.635 0.004 0.188)	$\times 10^1$	(1.636 0.044 0.095)	$\times 10^{-1}$		
3.29 – 3.64	5.028	0.132	0.290	(3.240 0.012 0.183)	$\times 10^1$	(1.552 0.041 0.043)	$\times 10^{-1}$		
3.64 – 4.02	4.229	0.109	0.244	(2.774 0.009 0.156)	$\times 10^1$	(1.525 0.040 0.042)	$\times 10^{-1}$		
4.02 – 4.43	3.534	0.091	0.204	(2.375 0.008 0.134)	$\times 10^1$	(1.488 0.039 0.041)	$\times 10^{-1}$		
4.43 – 4.88	2.856	0.072	0.165	(2.057 0.007 0.116)	$\times 10^1$	(1.388 0.035 0.038)	$\times 10^{-1}$		
4.88 – 5.37	2.225	0.056	0.128	(1.672 0.005 0.094)	$\times 10^1$	(1.331 0.034 0.037)	$\times 10^{-1}$		
5.37 – 5.90	1.878	0.047	0.108	(1.383 0.004 0.078)	$\times 10^1$	(1.358 0.035 0.038)	$\times 10^{-1}$		
5.90 – 6.47	1.503	0.039	0.087	(1.140 0.004 0.064)	$\times 10^1$	(1.318 0.034 0.036)	$\times 10^{-1}$		
6.47 – 7.09	1.228	0.032	0.071	9.285 0.029 0.523		(1.322 0.035 0.036)	$\times 10^{-1}$		
7.09 – 7.76	(9.870 0.115 0.320)	$\times 10^{-1}$		7.916 0.014 0.232		(1.247 0.015 0.033)	$\times 10^{-1}$		
7.76 – 8.48	(7.880 0.093 0.254)	$\times 10^{-1}$		6.429 0.010 0.189		(1.226 0.015 0.032)	$\times 10^{-1}$		
8.48 – 9.26	(6.257 0.075 0.203)	$\times 10^{-1}$		5.346 0.008 0.157		(1.170 0.014 0.031)	$\times 10^{-1}$		
9.26 – 10.10	(5.017 0.063 0.163)	$\times 10^{-1}$		4.337 0.006 0.127		(1.157 0.015 0.030)	$\times 10^{-1}$		
10.10 – 11.00	(3.951 0.052 0.128)	$\times 10^{-1}$		3.534 0.005 0.104		(1.118 0.015 0.029)	$\times 10^{-1}$		
11.00 – 12.00	(3.127 0.043 0.101)	$\times 10^{-1}$		2.926 0.004 0.086		(1.069 0.015 0.028)	$\times 10^{-1}$		
12.00 – 13.00	(2.513 0.038 0.083)	$\times 10^{-1}$		2.374 0.004 0.070		(1.058 0.016 0.029)	$\times 10^{-1}$		
13.00 – 14.10	(1.994 0.032 0.088)	$\times 10^{-1}$		1.918 0.003 0.056		(1.039 0.017 0.046)	$\times 10^{-1}$		
14.10 – 15.30	(1.538 0.027 0.082)	$\times 10^{-1}$		1.594 0.003 0.048		(9.644 0.168 0.559)	$\times 10^{-2}$		
15.30 – 16.60	–	–	–	1.299 0.002 0.043		–	–	–	
16.60 – 18.00	–	–	–	1.075 0.002 0.039		–	–	–	
18.00 – 19.50	–	–	–	(8.545 0.016 0.340)	$\times 10^{-1}$	–	–	–	
19.50 – 21.10	–	–	–	(6.810 0.014 0.281)	$\times 10^{-1}$	–	–	–	

TABLE SM V. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2442 to 2445 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	8.224 0.111 0.384	– – –	– – –
2.15 – 2.40	7.337 0.096 0.342	(4.343 0.006 0.151) $\times 10^1$	(1.689 0.022 0.066) $\times 10^{-1}$
2.40 – 2.67	6.831 0.204 0.434	(3.924 0.005 0.140) $\times 10^1$	(1.741 0.052 0.077) $\times 10^{-1}$
2.67 – 2.97	6.132 0.172 0.372	(3.582 0.004 0.142) $\times 10^1$	(1.712 0.048 0.074) $\times 10^{-1}$
2.97 – 3.29	5.181 0.144 0.315	(3.227 0.003 0.170) $\times 10^1$	(1.605 0.045 0.095) $\times 10^{-1}$
3.29 – 3.64	4.716 0.126 0.286	(2.931 0.011 0.174) $\times 10^1$	(1.609 0.044 0.044) $\times 10^{-1}$
3.64 – 4.02	3.933 0.104 0.239	(2.534 0.009 0.151) $\times 10^1$	(1.552 0.041 0.043) $\times 10^{-1}$
4.02 – 4.43	3.225 0.084 0.196	(2.219 0.008 0.132) $\times 10^1$	(1.453 0.038 0.040) $\times 10^{-1}$
4.43 – 4.88	2.739 0.070 0.166	(1.930 0.006 0.115) $\times 10^1$	(1.419 0.037 0.039) $\times 10^{-1}$
4.88 – 5.37	2.120 0.054 0.129	(1.546 0.005 0.092) $\times 10^1$	(1.372 0.035 0.038) $\times 10^{-1}$
5.37 – 5.90	1.770 0.045 0.107	(1.291 0.004 0.077) $\times 10^1$	(1.370 0.035 0.038) $\times 10^{-1}$
5.90 – 6.47	1.425 0.037 0.087	(1.103 0.004 0.066) $\times 10^1$	(1.292 0.034 0.036) $\times 10^{-1}$
6.47 – 7.09	1.144 0.031 0.070	8.950 0.029 0.532	(1.279 0.035 0.035) $\times 10^{-1}$
7.09 – 7.76	(9.346 0.111 0.319) $\times 10^{-1}$	7.365 0.013 0.230	(1.269 0.015 0.033) $\times 10^{-1}$
7.76 – 8.48	(7.665 0.092 0.261) $\times 10^{-1}$	6.305 0.010 0.197	(1.216 0.015 0.031) $\times 10^{-1}$
8.48 – 9.26	(6.007 0.073 0.205) $\times 10^{-1}$	5.132 0.008 0.160	(1.171 0.014 0.031) $\times 10^{-1}$
9.26 – 10.10	(4.863 0.061 0.166) $\times 10^{-1}$	4.170 0.006 0.130	(1.166 0.015 0.030) $\times 10^{-1}$
10.10 – 11.00	(3.860 0.051 0.132) $\times 10^{-1}$	3.483 0.005 0.109	(1.108 0.015 0.029) $\times 10^{-1}$
11.00 – 12.00	(3.083 0.042 0.105) $\times 10^{-1}$	2.857 0.004 0.089	(1.079 0.015 0.028) $\times 10^{-1}$
12.00 – 13.00	(2.465 0.037 0.085) $\times 10^{-1}$	2.328 0.004 0.073	(1.059 0.016 0.029) $\times 10^{-1}$
13.00 – 14.10	(1.963 0.031 0.090) $\times 10^{-1}$	1.901 0.003 0.059	(1.033 0.017 0.046) $\times 10^{-1}$
14.10 – 15.30	(1.543 0.027 0.084) $\times 10^{-1}$	1.541 0.003 0.050	(1.001 0.017 0.058) $\times 10^{-1}$
15.30 – 16.60	– – –	1.293 0.002 0.045	– – –
16.60 – 18.00	– – –	1.036 0.002 0.039	– – –
18.00 – 19.50	– – –	(8.558 0.016 0.353) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.796 0.014 0.289) $\times 10^{-1}$	– – –

TABLE SM VI. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2446 to 2449 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	8.719	0.112	0.393	–	–	–	–	–	–
2.15 – 2.40	7.850	0.098	0.354	(4.594 0.006 0.150)	$\times 10^1$	(1.709 0.021 0.067)	$\times 10^{-1}$		
2.40 – 2.67	6.836	0.198	0.453	(4.245 0.005 0.143)	$\times 10^1$	(1.610 0.047 0.076)	$\times 10^{-1}$		
2.67 – 2.97	6.268	0.170	0.398	(3.944 0.004 0.150)	$\times 10^1$	(1.589 0.043 0.074)	$\times 10^{-1}$		
2.97 – 3.29	5.637	0.150	0.358	(3.474 0.004 0.178)	$\times 10^1$	(1.623 0.043 0.100)	$\times 10^{-1}$		
3.29 – 3.64	4.710	0.122	0.299	(3.067 0.011 0.191)	$\times 10^1$	(1.536 0.040 0.042)	$\times 10^{-1}$		
3.64 – 4.02	4.210	0.107	0.268	(2.608 0.009 0.163)	$\times 10^1$	(1.614 0.041 0.045)	$\times 10^{-1}$		
4.02 – 4.43	3.477	0.088	0.221	(2.367 0.008 0.148)	$\times 10^1$	(1.469 0.037 0.041)	$\times 10^{-1}$		
4.43 – 4.88	2.823	0.070	0.179	(1.925 0.006 0.120)	$\times 10^1$	(1.467 0.037 0.041)	$\times 10^{-1}$		
4.88 – 5.37	2.282	0.056	0.145	(1.652 0.005 0.103)	$\times 10^1$	(1.381 0.034 0.038)	$\times 10^{-1}$		
5.37 – 5.90	1.878	0.047	0.119	(1.371 0.004 0.085)	$\times 10^1$	(1.370 0.034 0.038)	$\times 10^{-1}$		
5.90 – 6.47	1.505	0.038	0.096	(1.115 0.004 0.070)	$\times 10^1$	(1.350 0.035 0.037)	$\times 10^{-1}$		
6.47 – 7.09	1.220	0.032	0.078	9.306 0.029 0.580		(1.310 0.034 0.036)	$\times 10^{-1}$		
7.09 – 7.76	(9.723 0.113 0.336)	$\times 10^{-1}$		7.912 0.014 0.251		(1.229 0.015 0.032)	$\times 10^{-1}$		
7.76 – 8.48	(7.938 0.093 0.273)	$\times 10^{-1}$		6.419 0.010 0.204		(1.237 0.015 0.032)	$\times 10^{-1}$		
8.48 – 9.26	(6.334 0.076 0.219)	$\times 10^{-1}$		5.294 0.008 0.168		(1.197 0.014 0.031)	$\times 10^{-1}$		
9.26 – 10.10	(4.982 0.062 0.172)	$\times 10^{-1}$		4.340 0.006 0.138		(1.148 0.014 0.030)	$\times 10^{-1}$		
10.10 – 11.00	(3.982 0.052 0.137)	$\times 10^{-1}$		3.562 0.005 0.113		(1.118 0.015 0.029)	$\times 10^{-1}$		
11.00 – 12.00	(3.187 0.043 0.110)	$\times 10^{-1}$		2.953 0.004 0.094		(1.079 0.015 0.028)	$\times 10^{-1}$		
12.00 – 13.00	(2.546 0.038 0.089)	$\times 10^{-1}$		2.400 0.004 0.076		(1.061 0.016 0.029)	$\times 10^{-1}$		
13.00 – 14.10	(2.012 0.032 0.093)	$\times 10^{-1}$		1.941 0.003 0.062		(1.037 0.016 0.046)	$\times 10^{-1}$		
14.10 – 15.30	(1.562 0.027 0.086)	$\times 10^{-1}$		1.602 0.003 0.052		(9.747 0.168 0.565)	$\times 10^{-2}$		
15.30 – 16.60	–	–	–	1.306 0.002 0.046		–	–	–	
16.60 – 18.00	–	–	–	1.080 0.002 0.041		–	–	–	
18.00 – 19.50	–	–	–	(8.612 0.016 0.358)	$\times 10^{-1}$	–	–	–	
19.50 – 21.10	–	–	–	(6.814 0.014 0.292)	$\times 10^{-1}$	–	–	–	

TABLE SM VII. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2450 to 2453 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	8.392	0.112	0.385	–	–	–	–	–	–
2.15 – 2.40	7.707	0.099	0.353	(4.594 0.006 0.155)	$\times 10^1$	(1.678 0.022 0.065)	$\times 10^{-1}$		
2.40 – 2.67	6.962	0.208	0.433	(4.106 0.005 0.143)	$\times 10^1$	(1.696 0.051 0.074)	$\times 10^{-1}$		
2.67 – 2.97	5.943	0.166	0.353	(3.749 0.004 0.146)	$\times 10^1$	(1.585 0.044 0.069)	$\times 10^{-1}$		
2.97 – 3.29	5.333	0.147	0.317	(3.399 0.004 0.177)	$\times 10^1$	(1.569 0.043 0.092)	$\times 10^{-1}$		
3.29 – 3.64	4.493	0.121	0.267	(3.007 0.011 0.175)	$\times 10^1$	(1.494 0.041 0.041)	$\times 10^{-1}$		
3.64 – 4.02	3.852	0.102	0.229	(2.538 0.009 0.147)	$\times 10^1$	(1.518 0.041 0.042)	$\times 10^{-1}$		
4.02 – 4.43	3.299	0.086	0.196	(2.210 0.008 0.128)	$\times 10^1$	(1.493 0.039 0.041)	$\times 10^{-1}$		
4.43 – 4.88	2.707	0.069	0.161	(1.887 0.006 0.110)	$\times 10^1$	(1.434 0.037 0.040)	$\times 10^{-1}$		
4.88 – 5.37	2.186	0.055	0.130	(1.568 0.005 0.091)	$\times 10^1$	(1.394 0.036 0.039)	$\times 10^{-1}$		
5.37 – 5.90	1.748	0.045	0.104	(1.310 0.004 0.076)	$\times 10^1$	(1.335 0.034 0.037)	$\times 10^{-1}$		
5.90 – 6.47	1.438	0.038	0.085	(1.084 0.004 0.063)	$\times 10^1$	(1.327 0.035 0.037)	$\times 10^{-1}$		
6.47 – 7.09	1.157	0.031	0.069	9.083 0.029 0.528		(1.274 0.034 0.035)	$\times 10^{-1}$		
7.09 – 7.76	(9.406 0.112 0.316)	$\times 10^{-1}$		7.503 0.014 0.230		(1.254 0.015 0.033)	$\times 10^{-1}$		
7.76 – 8.48	(7.674 0.092 0.256)	$\times 10^{-1}$		6.228 0.010 0.191		(1.232 0.015 0.032)	$\times 10^{-1}$		
8.48 – 9.26	(6.104 0.075 0.205)	$\times 10^{-1}$		5.161 0.008 0.158		(1.183 0.015 0.031)	$\times 10^{-1}$		
9.26 – 10.10	(4.855 0.062 0.163)	$\times 10^{-1}$		4.236 0.006 0.130		(1.146 0.015 0.030)	$\times 10^{-1}$		
10.10 – 11.00	(3.869 0.052 0.130)	$\times 10^{-1}$		3.497 0.005 0.107		(1.106 0.015 0.029)	$\times 10^{-1}$		
11.00 – 12.00	(3.091 0.043 0.103)	$\times 10^{-1}$		2.871 0.004 0.088		(1.077 0.015 0.028)	$\times 10^{-1}$		
12.00 – 13.00	(2.509 0.038 0.085)	$\times 10^{-1}$		2.346 0.004 0.072		(1.069 0.016 0.029)	$\times 10^{-1}$		
13.00 – 14.10	(1.980 0.032 0.090)	$\times 10^{-1}$		1.944 0.003 0.060		(1.018 0.016 0.045)	$\times 10^{-1}$		
14.10 – 15.30	(1.546 0.027 0.084)	$\times 10^{-1}$		1.561 0.003 0.049		(9.908 0.173 0.574)	$\times 10^{-2}$		
15.30 – 16.60	–	–	–	1.313 0.002 0.045		–	–	–	
16.60 – 18.00	–	–	–	1.067 0.002 0.040		–	–	–	
18.00 – 19.50	–	–	–	(8.574 0.016 0.349)	$\times 10^{-1}$	–	–	–	
19.50 – 21.10	–	–	–	(6.812 0.014 0.287)	$\times 10^{-1}$	–	–	–	

TABLE SM VIII. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2454 to 2457 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	7.316	0.103	0.356	–	–	–	–	–	–
2.15 – 2.40	6.503	0.088	0.316	(3.727 0.005 0.139) $\times 10^1$	(1.745	0.024	0.068) $\times 10^{-1}$		
2.40 – 2.67	6.205	0.193	0.417	(3.625 0.004 0.139) $\times 10^1$	(1.712	0.053	0.077) $\times 10^{-1}$		
2.67 – 2.97	5.525	0.160	0.357	(3.372 0.004 0.142) $\times 10^1$	(1.639	0.047	0.072) $\times 10^{-1}$		
2.97 – 3.29	4.842	0.137	0.313	(3.038 0.003 0.166) $\times 10^1$	(1.594	0.045	0.095) $\times 10^{-1}$		
3.29 – 3.64	4.175	0.115	0.270	(2.808 0.010 0.178) $\times 10^1$	(1.487	0.041	0.041) $\times 10^{-1}$		
3.64 – 4.02	3.534	0.095	0.228	(2.402 0.008 0.152) $\times 10^1$	(1.471	0.040	0.041) $\times 10^{-1}$		
4.02 – 4.43	3.039	0.081	0.196	(2.100 0.007 0.133) $\times 10^1$	(1.447	0.039	0.040) $\times 10^{-1}$		
4.43 – 4.88	2.672	0.069	0.173	(1.784 0.006 0.113) $\times 10^1$	(1.498	0.039	0.041) $\times 10^{-1}$		
4.88 – 5.37	2.056	0.053	0.133	(1.514 0.005 0.096) $\times 10^1$	(1.358	0.035	0.038) $\times 10^{-1}$		
5.37 – 5.90	1.690	0.043	0.109	(1.251 0.004 0.079) $\times 10^1$	(1.350	0.035	0.037) $\times 10^{-1}$		
5.90 – 6.47	1.417	0.037	0.092	(1.097 0.004 0.070) $\times 10^1$	(1.291	0.034	0.036) $\times 10^{-1}$		
6.47 – 7.09	1.162	0.031	0.075	8.769 0.028 0.556	(1.325	0.035	0.037) $\times 10^{-1}$		
7.09 – 7.76	(9.226 0.109 0.310) $\times 10^{-1}$			7.342 0.013 0.225	(1.257	0.015	0.033) $\times 10^{-1}$		
7.76 – 8.48	(7.519 0.090 0.251) $\times 10^{-1}$			6.226 0.010 0.190	(1.208	0.015	0.031) $\times 10^{-1}$		
8.48 – 9.26	(6.079 0.074 0.204) $\times 10^{-1}$			5.103 0.008 0.156	(1.191	0.015	0.031) $\times 10^{-1}$		
9.26 – 10.10	(4.898 0.062 0.164) $\times 10^{-1}$			4.201 0.006 0.129	(1.166	0.015	0.031) $\times 10^{-1}$		
10.10 – 11.00	(3.898 0.051 0.131) $\times 10^{-1}$			3.459 0.005 0.106	(1.127	0.015	0.029) $\times 10^{-1}$		
11.00 – 12.00	(3.121 0.043 0.104) $\times 10^{-1}$			2.876 0.004 0.088	(1.085	0.015	0.028) $\times 10^{-1}$		
12.00 – 13.00	(2.475 0.037 0.084) $\times 10^{-1}$			2.341 0.004 0.072	(1.057	0.016	0.029) $\times 10^{-1}$		
13.00 – 14.10	(1.988 0.032 0.090) $\times 10^{-1}$			1.899 0.003 0.058	(1.047	0.017	0.046) $\times 10^{-1}$		
14.10 – 15.30	(1.553 0.027 0.084) $\times 10^{-1}$			1.576 0.003 0.050	(9.849	0.171	0.571) $\times 10^{-2}$		
15.30 – 16.60	–	–	–	1.284 0.002 0.044	–	–	–		
16.60 – 18.00	–	–	–	1.051 0.002 0.039	–	–	–		
18.00 – 19.50	–	–	–	(8.603 0.016 0.350) $\times 10^{-1}$	–	–	–		
19.50 – 21.10	–	–	–	(6.777 0.014 0.285) $\times 10^{-1}$	–	–	–		

TABLE SM IX. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2458 to 2461 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	7.056	0.102	0.336	–	–	–	–	–	–
2.15 – 2.40	6.447	0.090	0.307	(3.910 0.005 0.141)	$\times 10^1$	(1.649 0.023 0.064)	$\times 10^{-1}$		
2.40 – 2.67	5.918	0.186	0.428	(3.531 0.004 0.131)	$\times 10^1$	(1.676 0.053 0.082)	$\times 10^{-1}$		
2.67 – 2.97	5.637	0.166	0.394	(3.416 0.004 0.140)	$\times 10^1$	(1.650 0.048 0.080)	$\times 10^{-1}$		
2.97 – 3.29	4.791	0.137	0.335	(3.059 0.003 0.164)	$\times 10^1$	(1.566 0.045 0.099)	$\times 10^{-1}$		
3.29 – 3.64	4.444	0.124	0.310	(2.782 0.010 0.191)	$\times 10^1$	(1.597 0.045 0.044)	$\times 10^{-1}$		
3.64 – 4.02	3.653	0.099	0.255	(2.516 0.009 0.173)	$\times 10^1$	(1.452 0.040 0.040)	$\times 10^{-1}$		
4.02 – 4.43	3.182	0.085	0.222	(2.039 0.007 0.140)	$\times 10^1$	(1.560 0.042 0.043)	$\times 10^{-1}$		
4.43 – 4.88	2.601	0.068	0.182	(1.912 0.006 0.131)	$\times 10^1$	(1.361 0.036 0.038)	$\times 10^{-1}$		
4.88 – 5.37	2.064	0.053	0.144	(1.549 0.005 0.106)	$\times 10^1$	(1.333 0.035 0.037)	$\times 10^{-1}$		
5.37 – 5.90	1.776	0.046	0.124	(1.310 0.004 0.090)	$\times 10^1$	(1.355 0.035 0.038)	$\times 10^{-1}$		
5.90 – 6.47	1.434	0.038	0.100	(1.070 0.004 0.074)	$\times 10^1$	(1.341 0.036 0.037)	$\times 10^{-1}$		
6.47 – 7.09	1.162	0.031	0.081	9.035 0.029 0.621		(1.286 0.035 0.036)	$\times 10^{-1}$		
7.09 – 7.76	(9.247 0.112 0.317)	$\times 10^{-1}$		7.540 0.014 0.237		(1.226 0.015 0.032)	$\times 10^{-1}$		
7.76 – 8.48	(7.685 0.093 0.262)	$\times 10^{-1}$		6.351 0.010 0.199		(1.210 0.015 0.031)	$\times 10^{-1}$		
8.48 – 9.26	(6.061 0.075 0.208)	$\times 10^{-1}$		5.163 0.008 0.162		(1.174 0.015 0.031)	$\times 10^{-1}$		
9.26 – 10.10	(4.818 0.062 0.165)	$\times 10^{-1}$		4.150 0.006 0.130		(1.161 0.015 0.030)	$\times 10^{-1}$		
10.10 – 11.00	(3.908 0.053 0.134)	$\times 10^{-1}$		3.510 0.005 0.110		(1.113 0.015 0.029)	$\times 10^{-1}$		
11.00 – 12.00	(3.131 0.044 0.107)	$\times 10^{-1}$		2.920 0.004 0.092		(1.072 0.015 0.028)	$\times 10^{-1}$		
12.00 – 13.00	(2.523 0.039 0.088)	$\times 10^{-1}$		2.308 0.004 0.072		(1.093 0.017 0.030)	$\times 10^{-1}$		
13.00 – 14.10	(1.991 0.033 0.091)	$\times 10^{-1}$		1.950 0.003 0.061		(1.021 0.017 0.045)	$\times 10^{-1}$		
14.10 – 15.30	(1.569 0.028 0.086)	$\times 10^{-1}$		1.566 0.003 0.051		(1.001 0.018 0.058)	$\times 10^{-1}$		
15.30 – 16.60	–	–	–	1.307 0.002 0.045		–	–	–	
16.60 – 18.00	–	–	–	1.047 0.002 0.040		–	–	–	
18.00 – 19.50	–	–	–	(8.418 0.016 0.347)	$\times 10^{-1}$	–	–	–	
19.50 – 21.10	–	–	–	(6.931 0.015 0.296)	$\times 10^{-1}$	–	–	–	

TABLE SM X. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2462 to 2465 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	7.031	0.103	0.346	–	–	–	–	–	–
2.15 – 2.40	6.275	0.089	0.309	(3.662 0.005 0.140)	$\times 10^1$	(1.713 0.024 0.067)	$\times 10^{-1}$		
2.40 – 2.67	5.932	0.184	0.437	(3.592 0.004 0.141)	$\times 10^1$	(1.651 0.051 0.080)	$\times 10^{-1}$		
2.67 – 2.97	5.245	0.152	0.374	(3.291 0.004 0.141)	$\times 10^1$	(1.594 0.046 0.077)	$\times 10^{-1}$		
2.97 – 3.29	4.817	0.137	0.344	(2.994 0.003 0.165)	$\times 10^1$	(1.609 0.046 0.101)	$\times 10^{-1}$		
3.29 – 3.64	4.024	0.112	0.287	(2.747 0.010 0.193)	$\times 10^1$	(1.465 0.041 0.041)	$\times 10^{-1}$		
3.64 – 4.02	3.423	0.093	0.244	(2.349 0.008 0.165)	$\times 10^1$	(1.458 0.040 0.040)	$\times 10^{-1}$		
4.02 – 4.43	2.974	0.080	0.212	(2.023 0.007 0.142)	$\times 10^1$	(1.470 0.040 0.041)	$\times 10^{-1}$		
4.43 – 4.88	2.574	0.067	0.184	(1.761 0.006 0.124)	$\times 10^1$	(1.462 0.039 0.040)	$\times 10^{-1}$		
4.88 – 5.37	2.011	0.052	0.143	(1.483 0.005 0.104)	$\times 10^1$	(1.357 0.035 0.038)	$\times 10^{-1}$		
5.37 – 5.90	1.616	0.042	0.115	(1.253 0.004 0.088)	$\times 10^1$	(1.290 0.034 0.036)	$\times 10^{-1}$		
5.90 – 6.47	1.359	0.036	0.097	(1.055 0.003 0.074)	$\times 10^1$	(1.288 0.035 0.036)	$\times 10^{-1}$		
6.47 – 7.09	1.110	0.030	0.079	8.814 0.028 0.619		(1.259 0.034 0.035)	$\times 10^{-1}$		
7.09 – 7.76	(8.915 0.108 0.311)	$\times 10^{-1}$		7.379 0.013 0.237		(1.208 0.015 0.032)	$\times 10^{-1}$		
7.76 – 8.48	(7.407 0.090 0.257)	$\times 10^{-1}$		6.113 0.010 0.196		(1.212 0.015 0.031)	$\times 10^{-1}$		
8.48 – 9.26	(5.763 0.072 0.201)	$\times 10^{-1}$		5.038 0.008 0.162		(1.144 0.014 0.030)	$\times 10^{-1}$		
9.26 – 10.10	(4.646 0.060 0.162)	$\times 10^{-1}$		4.074 0.006 0.131		(1.141 0.015 0.030)	$\times 10^{-1}$		
10.10 – 11.00	(3.702 0.050 0.129)	$\times 10^{-1}$		3.437 0.005 0.110		(1.077 0.015 0.028)	$\times 10^{-1}$		
11.00 – 12.00	(3.000 0.042 0.104)	$\times 10^{-1}$		2.776 0.004 0.089		(1.081 0.015 0.028)	$\times 10^{-1}$		
12.00 – 13.00	(2.367 0.037 0.084)	$\times 10^{-1}$		2.236 0.003 0.072		(1.059 0.016 0.029)	$\times 10^{-1}$		
13.00 – 14.10	(1.897 0.031 0.088)	$\times 10^{-1}$		1.842 0.003 0.059		(1.029 0.017 0.046)	$\times 10^{-1}$		
14.10 – 15.30	(1.498 0.026 0.082)	$\times 10^{-1}$		1.529 0.003 0.050		(9.798 0.173 0.568)	$\times 10^{-2}$		
15.30 – 16.60	–	–	–	1.260 0.002 0.045		–	–	–	
16.60 – 18.00	–	–	–	1.019 0.002 0.039		–	–	–	
18.00 – 19.50	–	–	–	(8.206 0.016 0.343)	$\times 10^{-1}$	–	–	–	
19.50 – 21.10	–	–	–	(6.614 0.014 0.285)	$\times 10^{-1}$	–	–	–	

TABLE SM XI. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2466 to 2469 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	7.324	0.103	0.369	–	–	–	–	–	–
2.15 – 2.40	6.677	0.092	0.337	(4.048 0.005 0.160) $\times 10^1$	(1.649	0.023	0.064) $\times 10^{-1}$		
2.40 – 2.67	5.867	0.179	0.420	(3.689 0.004 0.150) $\times 10^1$	(1.590	0.049	0.074) $\times 10^{-1}$		
2.67 – 2.97	5.418	0.155	0.375	(3.459 0.004 0.153) $\times 10^1$	(1.566	0.045	0.071) $\times 10^{-1}$		
2.97 – 3.29	5.124	0.143	0.355	(3.104 0.003 0.174) $\times 10^1$	(1.651	0.046	0.100) $\times 10^{-1}$		
3.29 – 3.64	4.250	0.116	0.294	(2.739 0.010 0.187) $\times 10^1$	(1.552	0.043	0.043) $\times 10^{-1}$		
3.64 – 4.02	3.622	0.097	0.251	(2.419 0.008 0.165) $\times 10^1$	(1.497	0.040	0.041) $\times 10^{-1}$		
4.02 – 4.43	3.113	0.082	0.216	(2.131 0.007 0.145) $\times 10^1$	(1.461	0.039	0.040) $\times 10^{-1}$		
4.43 – 4.88	2.549	0.066	0.176	(1.800 0.006 0.123) $\times 10^1$	(1.416	0.037	0.039) $\times 10^{-1}$		
4.88 – 5.37	2.059	0.053	0.143	(1.520 0.005 0.104) $\times 10^1$	(1.354	0.035	0.038) $\times 10^{-1}$		
5.37 – 5.90	1.677	0.043	0.116	(1.290 0.004 0.088) $\times 10^1$	(1.300	0.034	0.036) $\times 10^{-1}$		
5.90 – 6.47	1.373	0.036	0.095	(1.074 0.003 0.073) $\times 10^1$	(1.279	0.034	0.035) $\times 10^{-1}$		
6.47 – 7.09	1.128	0.030	0.078	8.875 0.028 0.604	(1.271	0.034	0.035) $\times 10^{-1}$		
7.09 – 7.76	(9.287 0.111 0.334) $\times 10^{-1}$			7.461 0.013 0.248	(1.245	0.015	0.033) $\times 10^{-1}$		
7.76 – 8.48	(7.513 0.090 0.269) $\times 10^{-1}$			6.088 0.010 0.202	(1.234	0.015	0.032) $\times 10^{-1}$		
8.48 – 9.26	(5.918 0.073 0.213) $\times 10^{-1}$			5.050 0.008 0.168	(1.172	0.015	0.031) $\times 10^{-1}$		
9.26 – 10.10	(4.732 0.061 0.170) $\times 10^{-1}$			4.169 0.006 0.139	(1.135	0.015	0.030) $\times 10^{-1}$		
10.10 – 11.00	(3.722 0.050 0.134) $\times 10^{-1}$			3.464 0.005 0.115	(1.074	0.015	0.028) $\times 10^{-1}$		
11.00 – 12.00	(3.009 0.042 0.108) $\times 10^{-1}$			2.807 0.004 0.093	(1.072	0.015	0.028) $\times 10^{-1}$		
12.00 – 13.00	(2.394 0.037 0.087) $\times 10^{-1}$			2.302 0.004 0.077	(1.040	0.016	0.028) $\times 10^{-1}$		
13.00 – 14.10	(1.922 0.031 0.090) $\times 10^{-1}$			1.833 0.003 0.061	(1.049	0.017	0.046) $\times 10^{-1}$		
14.10 – 15.30	(1.516 0.027 0.085) $\times 10^{-1}$			1.524 0.003 0.052	(9.947	0.175	0.576) $\times 10^{-2}$		
15.30 – 16.60	–	–	–	1.266 0.002 0.046	–	–	–		
16.60 – 18.00	–	–	–	1.024 0.002 0.041	–	–	–		
18.00 – 19.50	–	–	–	(8.315 0.016 0.355) $\times 10^{-1}$	–	–	–		
19.50 – 21.10	–	–	–	(6.619 0.014 0.292) $\times 10^{-1}$	–	–	–		

TABLE SM XII. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2474 to 2477 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	7.999	0.112	0.404	–	–	–	–	–	–
2.15 – 2.40	7.056	0.096	0.356	(4.301 0.006 0.171) $\times 10^1$	(1.641 0.022 0.064) $\times 10^{-1}$	(1.591 0.048 0.077) $\times 10^{-1}$	(1.633 0.047 0.077) $\times 10^{-1}$	(1.584 0.045 0.098) $\times 10^{-1}$	(1.545 0.043 0.043) $\times 10^{-1}$
2.40 – 2.67	6.164	0.187	0.459	(3.874 0.005 0.157) $\times 10^1$	(1.591 0.048 0.077) $\times 10^{-1}$	(1.633 0.047 0.077) $\times 10^{-1}$	(1.584 0.045 0.098) $\times 10^{-1}$	(1.545 0.043 0.043) $\times 10^{-1}$	(1.481 0.041 0.041) $\times 10^{-1}$
2.67 – 2.97	5.840	0.167	0.421	(3.576 0.004 0.158) $\times 10^1$	(1.633 0.047 0.077) $\times 10^{-1}$	(1.633 0.047 0.077) $\times 10^{-1}$	(1.633 0.047 0.077) $\times 10^{-1}$	(1.584 0.045 0.098) $\times 10^{-1}$	(1.481 0.041 0.041) $\times 10^{-1}$
2.97 – 3.29	4.974	0.141	0.358	(3.139 0.004 0.176) $\times 10^1$	(1.584 0.045 0.098) $\times 10^{-1}$	(1.584 0.045 0.098) $\times 10^{-1}$	(1.584 0.045 0.098) $\times 10^{-1}$	(1.584 0.045 0.098) $\times 10^{-1}$	(1.481 0.041 0.041) $\times 10^{-1}$
3.29 – 3.64	4.163	0.115	0.300	(2.695 0.010 0.191) $\times 10^1$	(1.545 0.043 0.043) $\times 10^{-1}$	(1.545 0.043 0.043) $\times 10^{-1}$	(1.545 0.043 0.043) $\times 10^{-1}$	(1.545 0.043 0.043) $\times 10^{-1}$	(1.481 0.041 0.041) $\times 10^{-1}$
3.64 – 4.02	3.603	0.098	0.260	(2.433 0.009 0.173) $\times 10^1$	(1.481 0.041 0.041) $\times 10^{-1}$	(1.481 0.041 0.041) $\times 10^{-1}$	(1.481 0.041 0.041) $\times 10^{-1}$	(1.481 0.041 0.041) $\times 10^{-1}$	(1.481 0.041 0.041) $\times 10^{-1}$
4.02 – 4.43	3.030	0.081	0.218	(2.066 0.007 0.147) $\times 10^1$	(1.467 0.040 0.041) $\times 10^{-1}$	(1.467 0.040 0.041) $\times 10^{-1}$	(1.467 0.040 0.041) $\times 10^{-1}$	(1.467 0.040 0.041) $\times 10^{-1}$	(1.467 0.040 0.041) $\times 10^{-1}$
4.43 – 4.88	2.595	0.068	0.187	(1.778 0.006 0.126) $\times 10^1$	(1.460 0.039 0.040) $\times 10^{-1}$	(1.460 0.039 0.040) $\times 10^{-1}$	(1.460 0.039 0.040) $\times 10^{-1}$	(1.460 0.039 0.040) $\times 10^{-1}$	(1.460 0.039 0.040) $\times 10^{-1}$
4.88 – 5.37	2.042	0.053	0.147	(1.501 0.005 0.107) $\times 10^1$	(1.360 0.036 0.038) $\times 10^{-1}$	(1.360 0.036 0.038) $\times 10^{-1}$	(1.360 0.036 0.038) $\times 10^{-1}$	(1.360 0.036 0.038) $\times 10^{-1}$	(1.360 0.036 0.038) $\times 10^{-1}$
5.37 – 5.90	1.618	0.043	0.117	(1.235 0.004 0.088) $\times 10^1$	(1.310 0.035 0.036) $\times 10^{-1}$	(1.310 0.035 0.036) $\times 10^{-1}$	(1.310 0.035 0.036) $\times 10^{-1}$	(1.310 0.035 0.036) $\times 10^{-1}$	(1.310 0.035 0.036) $\times 10^{-1}$
5.90 – 6.47	1.304	0.035	0.094	(1.027 0.003 0.073) $\times 10^1$	(1.269 0.035 0.035) $\times 10^{-1}$	(1.269 0.035 0.035) $\times 10^{-1}$	(1.269 0.035 0.035) $\times 10^{-1}$	(1.269 0.035 0.035) $\times 10^{-1}$	(1.269 0.035 0.035) $\times 10^{-1}$
6.47 – 7.09	1.085	0.030	0.078	8.607 0.028 0.611	(1.261 0.035 0.035) $\times 10^{-1}$	(1.261 0.035 0.035) $\times 10^{-1}$	(1.261 0.035 0.035) $\times 10^{-1}$	(1.261 0.035 0.035) $\times 10^{-1}$	(1.261 0.035 0.035) $\times 10^{-1}$
7.09 – 7.76	(8.735 0.107 0.312) $\times 10^{-1}$			7.226 0.013 0.238	(1.209 0.015 0.032) $\times 10^{-1}$	(1.209 0.015 0.032) $\times 10^{-1}$	(1.209 0.015 0.032) $\times 10^{-1}$	(1.209 0.015 0.032) $\times 10^{-1}$	(1.209 0.015 0.032) $\times 10^{-1}$
7.76 – 8.48	(7.132 0.088 0.254) $\times 10^{-1}$			5.904 0.010 0.195	(1.208 0.015 0.031) $\times 10^{-1}$	(1.208 0.015 0.031) $\times 10^{-1}$	(1.208 0.015 0.031) $\times 10^{-1}$	(1.208 0.015 0.031) $\times 10^{-1}$	(1.208 0.015 0.031) $\times 10^{-1}$
8.48 – 9.26	(5.647 0.071 0.202) $\times 10^{-1}$			4.865 0.007 0.160	(1.161 0.015 0.030) $\times 10^{-1}$	(1.161 0.015 0.030) $\times 10^{-1}$	(1.161 0.015 0.030) $\times 10^{-1}$	(1.161 0.015 0.030) $\times 10^{-1}$	(1.161 0.015 0.030) $\times 10^{-1}$
9.26 – 10.10	(4.577 0.060 0.164) $\times 10^{-1}$			3.960 0.006 0.131	(1.156 0.015 0.030) $\times 10^{-1}$	(1.156 0.015 0.030) $\times 10^{-1}$	(1.156 0.015 0.030) $\times 10^{-1}$	(1.156 0.015 0.030) $\times 10^{-1}$	(1.156 0.015 0.030) $\times 10^{-1}$
10.10 – 11.00	(3.616 0.050 0.129) $\times 10^{-1}$			3.292 0.005 0.109	(1.098 0.015 0.029) $\times 10^{-1}$	(1.098 0.015 0.029) $\times 10^{-1}$	(1.098 0.015 0.029) $\times 10^{-1}$	(1.098 0.015 0.029) $\times 10^{-1}$	(1.098 0.015 0.029) $\times 10^{-1}$
11.00 – 12.00	(2.919 0.042 0.104) $\times 10^{-1}$			2.720 0.004 0.090	(1.073 0.015 0.028) $\times 10^{-1}$	(1.073 0.015 0.028) $\times 10^{-1}$	(1.073 0.015 0.028) $\times 10^{-1}$	(1.073 0.015 0.028) $\times 10^{-1}$	(1.073 0.015 0.028) $\times 10^{-1}$
12.00 – 13.00	(2.320 0.036 0.084) $\times 10^{-1}$			2.180 0.003 0.072	(1.064 0.017 0.029) $\times 10^{-1}$	(1.064 0.017 0.029) $\times 10^{-1}$	(1.064 0.017 0.029) $\times 10^{-1}$	(1.064 0.017 0.029) $\times 10^{-1}$	(1.064 0.017 0.029) $\times 10^{-1}$
13.00 – 14.10	(1.858 0.031 0.087) $\times 10^{-1}$			1.792 0.003 0.059	(1.037 0.017 0.046) $\times 10^{-1}$	(1.037 0.017 0.046) $\times 10^{-1}$	(1.037 0.017 0.046) $\times 10^{-1}$	(1.037 0.017 0.046) $\times 10^{-1}$	(1.037 0.017 0.046) $\times 10^{-1}$
14.10 – 15.30	(1.475 0.026 0.082) $\times 10^{-1}$			1.487 0.002 0.050	(9.921 0.177 0.575) $\times 10^{-2}$	(9.921 0.177 0.575) $\times 10^{-2}$	(9.921 0.177 0.575) $\times 10^{-2}$	(9.921 0.177 0.575) $\times 10^{-2}$	(9.921 0.177 0.575) $\times 10^{-2}$
15.30 – 16.60	–	–	–	1.216 0.002 0.044	–	–	–	–	–
16.60 – 18.00	–	–	–	(9.770 0.018 0.385) $\times 10^{-1}$	–	–	–	–	–
18.00 – 19.50	–	–	–	(8.010 0.016 0.341) $\times 10^{-1}$	–	–	–	–	–
19.50 – 21.10	–	–	–	(6.398 0.014 0.281) $\times 10^{-1}$	–	–	–	–	–

TABLE SM XIII. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2478 to 2481 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	7.613	0.110	0.376	–	–	–	–	–	–
2.15 – 2.40	6.733	0.094	0.333	(4.014 0.005 0.154)	$\times 10^1$	(1.677 0.024 0.065)	$\times 10^{-1}$		
2.40 – 2.67	6.239	0.195	0.457	(3.832 0.005 0.151)	$\times 10^1$	(1.628 0.051 0.079)	$\times 10^{-1}$		
2.67 – 2.97	5.521	0.163	0.392	(3.475 0.004 0.149)	$\times 10^1$	(1.589 0.047 0.076)	$\times 10^{-1}$		
2.97 – 3.29	4.759	0.138	0.338	(3.132 0.004 0.173)	$\times 10^1$	(1.520 0.044 0.094)	$\times 10^{-1}$		
3.29 – 3.64	4.198	0.118	0.298	(2.730 0.010 0.191)	$\times 10^1$	(1.538 0.044 0.042)	$\times 10^{-1}$		
3.64 – 4.02	3.697	0.102	0.262	(2.425 0.009 0.169)	$\times 10^1$	(1.524 0.042 0.042)	$\times 10^{-1}$		
4.02 – 4.43	3.033	0.082	0.215	(2.088 0.007 0.146)	$\times 10^1$	(1.453 0.040 0.040)	$\times 10^{-1}$		
4.43 – 4.88	2.534	0.067	0.180	(1.771 0.006 0.124)	$\times 10^1$	(1.431 0.038 0.039)	$\times 10^{-1}$		
4.88 – 5.37	2.037	0.054	0.145	(1.515 0.005 0.106)	$\times 10^1$	(1.344 0.036 0.037)	$\times 10^{-1}$		
5.37 – 5.90	1.662	0.044	0.118	(1.242 0.004 0.087)	$\times 10^1$	(1.338 0.036 0.037)	$\times 10^{-1}$		
5.90 – 6.47	1.376	0.037	0.098	(1.042 0.003 0.073)	$\times 10^1$	(1.320 0.036 0.036)	$\times 10^{-1}$		
6.47 – 7.09	1.125	0.031	0.080	8.676	0.028	0.606	(1.297 0.036 0.036)	$\times 10^{-1}$	
7.09 – 7.76	(8.910 0.110 0.315)	$\times 10^{-1}$		7.239	0.014	0.236	(1.231 0.015 0.032)	$\times 10^{-1}$	
7.76 – 8.48	(7.176 0.089 0.253)	$\times 10^{-1}$		5.947	0.010	0.194	(1.207 0.015 0.031)	$\times 10^{-1}$	
8.48 – 9.26	(5.655 0.072 0.200)	$\times 10^{-1}$		4.880	0.008	0.159	(1.159 0.015 0.030)	$\times 10^{-1}$	
9.26 – 10.10	(4.627 0.061 0.164)	$\times 10^{-1}$		4.022	0.006	0.131	(1.150 0.015 0.030)	$\times 10^{-1}$	
10.10 – 11.00	(3.689 0.051 0.130)	$\times 10^{-1}$		3.329	0.005	0.109	(1.108 0.015 0.029)	$\times 10^{-1}$	
11.00 – 12.00	(2.980 0.042 0.105)	$\times 10^{-1}$		2.686	0.004	0.088	(1.109 0.016 0.029)	$\times 10^{-1}$	
12.00 – 13.00	(2.364 0.037 0.085)	$\times 10^{-1}$		2.222	0.004	0.072	(1.064 0.017 0.029)	$\times 10^{-1}$	
13.00 – 14.10	(1.895 0.031 0.088)	$\times 10^{-1}$		1.817	0.003	0.059	(1.043 0.017 0.046)	$\times 10^{-1}$	
14.10 – 15.30	(1.488 0.027 0.082)	$\times 10^{-1}$		1.495	0.003	0.050	(9.954 0.179 0.576)	$\times 10^{-2}$	
15.30 – 16.60	–	–	–	1.226	0.002	0.044	–	–	–
16.60 – 18.00	–	–	–	(9.980 0.019 0.390)	$\times 10^{-1}$	–	–	–	
18.00 – 19.50	–	–	–	(8.186 0.016 0.346)	$\times 10^{-1}$	–	–	–	
19.50 – 21.10	–	–	–	(6.548 0.014 0.285)	$\times 10^{-1}$	–	–	–	

TABLE SM XIV. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2482 to 2485 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	8.905	0.124	0.447	–	–	–	–	–	–
2.15 – 2.40	7.909	0.107	0.397	(4.740 0.006 0.187) $\times 10^1$	(1.668	0.023	0.065) $\times 10^{-1}$		
2.40 – 2.67	6.981	0.213	0.518	(4.409 0.005 0.178) $\times 10^1$	(1.583	0.048	0.076) $\times 10^{-1}$		
2.67 – 2.97	6.036	0.173	0.433	(3.971 0.004 0.174) $\times 10^1$	(1.520	0.044	0.072) $\times 10^{-1}$		
2.97 – 3.29	5.547	0.156	0.398	(3.528 0.004 0.197) $\times 10^1$	(1.572	0.044	0.098) $\times 10^{-1}$		
3.29 – 3.64	4.652	0.127	0.334	(3.072 0.011 0.217) $\times 10^1$	(1.514	0.042	0.042) $\times 10^{-1}$		
3.64 – 4.02	4.023	0.108	0.289	(2.668 0.009 0.189) $\times 10^1$	(1.508	0.041	0.042) $\times 10^{-1}$		
4.02 – 4.43	3.292	0.088	0.236	(2.290 0.008 0.162) $\times 10^1$	(1.437	0.039	0.040) $\times 10^{-1}$		
4.43 – 4.88	2.757	0.072	0.198	(1.903 0.006 0.135) $\times 10^1$	(1.449	0.038	0.040) $\times 10^{-1}$		
4.88 – 5.37	2.155	0.056	0.155	(1.617 0.005 0.114) $\times 10^1$	(1.332	0.035	0.037) $\times 10^{-1}$		
5.37 – 5.90	1.719	0.045	0.123	(1.329 0.004 0.094) $\times 10^1$	(1.293	0.034	0.036) $\times 10^{-1}$		
5.90 – 6.47	1.418	0.038	0.102	(1.101 0.004 0.078) $\times 10^1$	(1.287	0.035	0.036) $\times 10^{-1}$		
6.47 – 7.09	1.162	0.032	0.083	9.173 0.030 0.649	(1.267	0.035	0.035) $\times 10^{-1}$		
7.09 – 7.76	(9.210 0.113 0.319) $\times 10^{-1}$			7.363 0.014 0.234	(1.251	0.016	0.033) $\times 10^{-1}$		
7.76 – 8.48	(7.514 0.093 0.259) $\times 10^{-1}$			6.195 0.010 0.197	(1.213	0.015	0.031) $\times 10^{-1}$		
8.48 – 9.26	(5.862 0.074 0.203) $\times 10^{-1}$			5.020 0.008 0.160	(1.168	0.015	0.031) $\times 10^{-1}$		
9.26 – 10.10	(4.689 0.061 0.162) $\times 10^{-1}$			4.127 0.006 0.131	(1.136	0.015	0.030) $\times 10^{-1}$		
10.10 – 11.00	(3.803 0.052 0.132) $\times 10^{-1}$			3.373 0.005 0.107	(1.128	0.016	0.029) $\times 10^{-1}$		
11.00 – 12.00	(3.056 0.044 0.106) $\times 10^{-1}$			2.768 0.004 0.088	(1.104	0.016	0.029) $\times 10^{-1}$		
12.00 – 13.00	(2.419 0.038 0.085) $\times 10^{-1}$			2.221 0.004 0.071	(1.089	0.017	0.030) $\times 10^{-1}$		
13.00 – 14.10	(1.912 0.032 0.088) $\times 10^{-1}$			1.854 0.003 0.059	(1.031	0.017	0.046) $\times 10^{-1}$		
14.10 – 15.30	(1.488 0.027 0.082) $\times 10^{-1}$			1.509 0.003 0.049	(9.862	0.178	0.572) $\times 10^{-2}$		
15.30 – 16.60	–	–	–	1.255 0.002 0.044	–	–	–		
16.60 – 18.00	–	–	–	1.016 0.002 0.039	–	–	–		
18.00 – 19.50	–	–	–	(8.154 0.016 0.339) $\times 10^{-1}$	–	–	–		
19.50 – 21.10	–	–	–	(6.441 0.014 0.277) $\times 10^{-1}$	–	–	–		

TABLE SM XV. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2486 to 2489 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	9.969	0.130	0.484	–	–	–	–	–	–
2.15 – 2.40	8.759	0.112	0.425	(5.298 0.007 0.197) $\times 10^1$	(1.653	0.021	0.064) $\times 10^{-1}$		
2.40 – 2.67	7.908	0.227	0.592	(4.941 0.006 0.189) $\times 10^1$	(1.601	0.046	0.080) $\times 10^{-1}$		
2.67 – 2.97	7.037	0.192	0.510	(4.326 0.005 0.181) $\times 10^1$	(1.627	0.045	0.081) $\times 10^{-1}$		
2.97 – 3.29	5.669	0.154	0.411	(3.797 0.004 0.207) $\times 10^1$	(1.493	0.041	0.095) $\times 10^{-1}$		
3.29 – 3.64	4.947	0.132	0.359	(3.192 0.011 0.228) $\times 10^1$	(1.550	0.042	0.043) $\times 10^{-1}$		
3.64 – 4.02	4.214	0.110	0.305	(2.950 0.010 0.211) $\times 10^1$	(1.428	0.038	0.039) $\times 10^{-1}$		
4.02 – 4.43	3.505	0.091	0.254	(2.318 0.008 0.166) $\times 10^1$	(1.513	0.040	0.042) $\times 10^{-1}$		
4.43 – 4.88	2.836	0.073	0.206	(2.067 0.007 0.148) $\times 10^1$	(1.372	0.035	0.038) $\times 10^{-1}$		
4.88 – 5.37	2.254	0.057	0.163	(1.654 0.005 0.118) $\times 10^1$	(1.363	0.035	0.038) $\times 10^{-1}$		
5.37 – 5.90	1.763	0.046	0.128	(1.370 0.004 0.098) $\times 10^1$	(1.287	0.034	0.036) $\times 10^{-1}$		
5.90 – 6.47	1.412	0.038	0.102	(1.118 0.004 0.080) $\times 10^1$	(1.263	0.034	0.035) $\times 10^{-1}$		
6.47 – 7.09	1.181	0.032	0.086	9.236 0.030 0.660	(1.279	0.035	0.035) $\times 10^{-1}$		
7.09 – 7.76	(9.322 0.113 0.320) $\times 10^{-1}$			7.450 0.014 0.234	(1.251	0.015	0.033) $\times 10^{-1}$		
7.76 – 8.48	(7.384 0.091 0.252) $\times 10^{-1}$			6.305 0.010 0.198	(1.171	0.015	0.030) $\times 10^{-1}$		
8.48 – 9.26	(5.927 0.074 0.204) $\times 10^{-1}$			5.049 0.008 0.159	(1.174	0.015	0.031) $\times 10^{-1}$		
9.26 – 10.10	(4.780 0.062 0.164) $\times 10^{-1}$			4.133 0.006 0.130	(1.157	0.015	0.030) $\times 10^{-1}$		
10.10 – 11.00	(3.746 0.051 0.128) $\times 10^{-1}$			3.396 0.005 0.107	(1.103	0.015	0.029) $\times 10^{-1}$		
11.00 – 12.00	(3.021 0.043 0.103) $\times 10^{-1}$			2.766 0.004 0.087	(1.092	0.016	0.028) $\times 10^{-1}$		
12.00 – 13.00	(2.415 0.038 0.084) $\times 10^{-1}$			2.304 0.004 0.073	(1.048	0.017	0.029) $\times 10^{-1}$		
13.00 – 14.10	(1.943 0.032 0.089) $\times 10^{-1}$			1.850 0.003 0.058	(1.050	0.018	0.046) $\times 10^{-1}$		
14.10 – 15.30	(1.539 0.028 0.084) $\times 10^{-1}$			1.526 0.003 0.049	(1.009	0.018	0.059) $\times 10^{-1}$		
15.30 – 16.60	–	–	–	1.250 0.002 0.044	–	–	–		
16.60 – 18.00	–	–	–	1.027 0.002 0.039	–	–	–		
18.00 – 19.50	–	–	–	(8.278 0.016 0.342) $\times 10^{-1}$	–	–	–		
19.50 – 21.10	–	–	–	(6.705 0.014 0.286) $\times 10^{-1}$	–	–	–		

TABLE SM XVI. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2490 to 2493 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.134 0.014 0.055) $\times 10^1$	– – –	– – –
2.15 – 2.40	9.860 0.122 0.479	(5.958 0.007 0.222) $\times 10^1$	(1.655 0.021 0.064) $\times 10^{-1}$
2.40 – 2.67	8.458 0.238 0.619	(5.488 0.006 0.210) $\times 10^1$	(1.541 0.043 0.076) $\times 10^{-1}$
2.67 – 2.97	7.539 0.201 0.534	(4.796 0.005 0.201) $\times 10^1$	(1.572 0.042 0.076) $\times 10^{-1}$
2.97 – 3.29	6.513 0.171 0.462	(4.204 0.004 0.229) $\times 10^1$	(1.549 0.041 0.097) $\times 10^{-1}$
3.29 – 3.64	5.415 0.140 0.384	(3.503 0.012 0.244) $\times 10^1$	(1.546 0.040 0.043) $\times 10^{-1}$
3.64 – 4.02	4.479 0.115 0.317	(3.062 0.010 0.214) $\times 10^1$	(1.463 0.038 0.040) $\times 10^{-1}$
4.02 – 4.43	3.658 0.094 0.259	(2.625 0.009 0.183) $\times 10^1$	(1.393 0.036 0.038) $\times 10^{-1}$
4.43 – 4.88	2.969 0.075 0.210	(2.105 0.007 0.147) $\times 10^1$	(1.410 0.036 0.039) $\times 10^{-1}$
4.88 – 5.37	2.443 0.061 0.173	(1.741 0.006 0.121) $\times 10^1$	(1.404 0.035 0.039) $\times 10^{-1}$
5.37 – 5.90	1.929 0.049 0.137	(1.405 0.005 0.098) $\times 10^1$	(1.373 0.035 0.038) $\times 10^{-1}$
5.90 – 6.47	1.518 0.040 0.108	(1.164 0.004 0.081) $\times 10^1$	(1.304 0.034 0.036) $\times 10^{-1}$
6.47 – 7.09	1.230 0.033 0.087	9.704 0.031 0.677	(1.268 0.034 0.035) $\times 10^{-1}$
7.09 – 7.76	(9.836 0.118 0.352) $\times 10^{-1}$	7.865 0.014 0.259	(1.251 0.015 0.033) $\times 10^{-1}$
7.76 – 8.48	(7.817 0.095 0.278) $\times 10^{-1}$	6.542 0.011 0.216	(1.195 0.015 0.031) $\times 10^{-1}$
8.48 – 9.26	(6.276 0.078 0.224) $\times 10^{-1}$	5.285 0.008 0.174	(1.188 0.015 0.031) $\times 10^{-1}$
9.26 – 10.10	(4.939 0.064 0.177) $\times 10^{-1}$	4.273 0.006 0.141	(1.156 0.015 0.030) $\times 10^{-1}$
10.10 – 11.00	(3.921 0.053 0.140) $\times 10^{-1}$	3.539 0.005 0.117	(1.108 0.015 0.029) $\times 10^{-1}$
11.00 – 12.00	(3.130 0.044 0.112) $\times 10^{-1}$	2.837 0.004 0.094	(1.103 0.016 0.029) $\times 10^{-1}$
12.00 – 13.00	(2.479 0.039 0.090) $\times 10^{-1}$	2.314 0.004 0.076	(1.071 0.017 0.029) $\times 10^{-1}$
13.00 – 14.10	(1.980 0.033 0.093) $\times 10^{-1}$	1.888 0.003 0.062	(1.049 0.018 0.046) $\times 10^{-1}$
14.10 – 15.30	(1.552 0.028 0.086) $\times 10^{-1}$	1.561 0.003 0.053	(9.945 0.178 0.576) $\times 10^{-2}$
15.30 – 16.60	– – –	1.275 0.002 0.046	– – –
16.60 – 18.00	– – –	1.037 0.002 0.041	– – –
18.00 – 19.50	– – –	(8.348 0.017 0.355) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.664 0.014 0.292) $\times 10^{-1}$	– – –

TABLE SM XVII. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2494 to 2497 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.223 0.015 0.059) $\times 10^1$	– – –	– – –
2.15 – 2.40	(1.034 0.012 0.050) $\times 10^1$	(6.642 0.008 0.243) $\times 10^1$	(1.556 0.019 0.061) $\times 10^{-1}$
2.40 – 2.67	9.495 0.260 0.720	(5.723 0.006 0.215) $\times 10^1$	(1.659 0.045 0.085) $\times 10^{-1}$
2.67 – 2.97	7.768 0.203 0.571	(5.097 0.005 0.211) $\times 10^1$	(1.524 0.040 0.077) $\times 10^{-1}$
2.97 – 3.29	6.398 0.168 0.470	(4.354 0.004 0.235) $\times 10^1$	(1.470 0.039 0.095) $\times 10^{-1}$
3.29 – 3.64	5.628 0.145 0.414	(3.714 0.013 0.269) $\times 10^1$	(1.516 0.039 0.042) $\times 10^{-1}$
3.64 – 4.02	4.555 0.117 0.335	(3.097 0.010 0.224) $\times 10^1$	(1.471 0.038 0.041) $\times 10^{-1}$
4.02 – 4.43	3.692 0.094 0.272	(2.590 0.009 0.188) $\times 10^1$	(1.426 0.037 0.039) $\times 10^{-1}$
4.43 – 4.88	3.016 0.076 0.222	(2.218 0.007 0.161) $\times 10^1$	(1.360 0.034 0.038) $\times 10^{-1}$
4.88 – 5.37	2.388 0.060 0.176	(1.765 0.006 0.128) $\times 10^1$	(1.353 0.034 0.037) $\times 10^{-1}$
5.37 – 5.90	1.902 0.048 0.140	(1.458 0.005 0.106) $\times 10^1$	(1.305 0.033 0.036) $\times 10^{-1}$
5.90 – 6.47	1.518 0.040 0.112	(1.192 0.004 0.086) $\times 10^1$	(1.274 0.034 0.035) $\times 10^{-1}$
6.47 – 7.09	1.244 0.033 0.091	9.782 0.031 0.709	(1.272 0.034 0.035) $\times 10^{-1}$
7.09 – 7.76	(9.868 0.118 0.353) $\times 10^{-1}$	8.113 0.015 0.268	(1.216 0.015 0.032) $\times 10^{-1}$
7.76 – 8.48	(7.915 0.096 0.282) $\times 10^{-1}$	6.632 0.011 0.219	(1.193 0.015 0.031) $\times 10^{-1}$
8.48 – 9.26	(6.277 0.078 0.225) $\times 10^{-1}$	5.335 0.008 0.176	(1.177 0.015 0.031) $\times 10^{-1}$
9.26 – 10.10	(4.994 0.065 0.179) $\times 10^{-1}$	4.265 0.006 0.141	(1.171 0.015 0.031) $\times 10^{-1}$
10.10 – 11.00	(3.955 0.054 0.141) $\times 10^{-1}$	3.585 0.005 0.118	(1.103 0.015 0.029) $\times 10^{-1}$
11.00 – 12.00	(3.142 0.045 0.112) $\times 10^{-1}$	2.888 0.004 0.095	(1.088 0.016 0.028) $\times 10^{-1}$
12.00 – 13.00	(2.496 0.039 0.090) $\times 10^{-1}$	2.359 0.004 0.078	(1.058 0.017 0.029) $\times 10^{-1}$
13.00 – 14.10	(1.980 0.033 0.093) $\times 10^{-1}$	1.924 0.003 0.064	(1.029 0.017 0.046) $\times 10^{-1}$
14.10 – 15.30	(1.543 0.028 0.086) $\times 10^{-1}$	1.570 0.003 0.053	(9.827 0.178 0.570) $\times 10^{-2}$
15.30 – 16.60	– – –	1.298 0.002 0.047	– – –
16.60 – 18.00	– – –	1.049 0.002 0.041	– – –
18.00 – 19.50	– – –	(8.574 0.017 0.365) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.756 0.014 0.296) $\times 10^{-1}$	– – –

TABLE SM XVIII. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2498 to 2501 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.294 0.016 0.062) $\times 10^1$	– – –	– – –
2.15 – 2.40	(1.122 0.013 0.054) $\times 10^1$	(6.918 0.008 0.253) $\times 10^1$	(1.621 0.020 0.063) $\times 10^{-1}$
2.40 – 2.67	9.769 0.268 0.718	(6.130 0.007 0.231) $\times 10^1$	(1.594 0.044 0.079) $\times 10^{-1}$
2.67 – 2.97	8.612 0.225 0.613	(5.392 0.006 0.223) $\times 10^1$	(1.597 0.042 0.078) $\times 10^{-1}$
2.97 – 3.29	6.918 0.181 0.492	(4.511 0.005 0.244) $\times 10^1$	(1.534 0.040 0.097) $\times 10^{-1}$
3.29 – 3.64	5.736 0.148 0.408	(3.896 0.014 0.273) $\times 10^1$	(1.472 0.038 0.041) $\times 10^{-1}$
3.64 – 4.02	4.720 0.121 0.336	(3.367 0.011 0.236) $\times 10^1$	(1.402 0.036 0.039) $\times 10^{-1}$
4.02 – 4.43	3.901 0.099 0.278	(2.751 0.009 0.193) $\times 10^1$	(1.418 0.036 0.039) $\times 10^{-1}$
4.43 – 4.88	3.271 0.082 0.233	(2.264 0.007 0.159) $\times 10^1$	(1.445 0.036 0.040) $\times 10^{-1}$
4.88 – 5.37	2.449 0.061 0.174	(1.839 0.006 0.129) $\times 10^1$	(1.331 0.034 0.037) $\times 10^{-1}$
5.37 – 5.90	1.960 0.050 0.139	(1.455 0.005 0.102) $\times 10^1$	(1.347 0.034 0.037) $\times 10^{-1}$
5.90 – 6.47	1.582 0.041 0.113	(1.229 0.004 0.086) $\times 10^1$	(1.287 0.034 0.036) $\times 10^{-1}$
6.47 – 7.09	1.215 0.033 0.086	9.994 0.032 0.701	(1.215 0.033 0.034) $\times 10^{-1}$
7.09 – 7.76	(9.807 0.119 0.354) $\times 10^{-1}$	8.261 0.015 0.275	(1.187 0.015 0.031) $\times 10^{-1}$
7.76 – 8.48	(8.060 0.098 0.289) $\times 10^{-1}$	6.695 0.011 0.223	(1.204 0.015 0.031) $\times 10^{-1}$
8.48 – 9.26	(6.345 0.079 0.229) $\times 10^{-1}$	5.394 0.008 0.180	(1.176 0.015 0.031) $\times 10^{-1}$
9.26 – 10.10	(4.943 0.064 0.178) $\times 10^{-1}$	4.359 0.007 0.145	(1.134 0.015 0.030) $\times 10^{-1}$
10.10 – 11.00	(4.026 0.055 0.145) $\times 10^{-1}$	3.589 0.005 0.120	(1.122 0.015 0.029) $\times 10^{-1}$
11.00 – 12.00	(3.198 0.046 0.115) $\times 10^{-1}$	2.954 0.004 0.098	(1.083 0.016 0.028) $\times 10^{-1}$
12.00 – 13.00	(2.544 0.040 0.093) $\times 10^{-1}$	2.317 0.004 0.077	(1.098 0.017 0.030) $\times 10^{-1}$
13.00 – 14.10	(2.014 0.034 0.095) $\times 10^{-1}$	1.929 0.003 0.064	(1.044 0.018 0.046) $\times 10^{-1}$
14.10 – 15.30	(1.576 0.028 0.088) $\times 10^{-1}$	1.592 0.003 0.054	(9.899 0.179 0.574) $\times 10^{-2}$
15.30 – 16.60	– – –	1.293 0.002 0.047	– – –
16.60 – 18.00	– – –	1.055 0.002 0.042	– – –
18.00 – 19.50	– – –	(8.573 0.017 0.367) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.876 0.015 0.303) $\times 10^{-1}$	– – –

TABLE SM XIX. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2502 to 2505 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.391 0.017 0.066) $\times 10^1$	– – –	– – –
2.15 – 2.40	(1.191 0.014 0.056) $\times 10^1$	(7.422 0.009 0.264) $\times 10^1$	(1.605 0.019 0.063) $\times 10^{-1}$
2.40 – 2.67	(1.001 0.028 0.078) $\times 10^1$	(6.520 0.007 0.239) $\times 10^1$	(1.535 0.042 0.083) $\times 10^{-1}$
2.67 – 2.97	9.152 0.241 0.697	(5.725 0.006 0.232) $\times 10^1$	(1.599 0.042 0.086) $\times 10^{-1}$
2.97 – 3.29	7.203 0.190 0.549	(4.796 0.005 0.256) $\times 10^1$	(1.502 0.040 0.100) $\times 10^{-1}$
3.29 – 3.64	5.750 0.150 0.438	(4.060 0.014 0.305) $\times 10^1$	(1.416 0.037 0.039) $\times 10^{-1}$
3.64 – 4.02	5.088 0.132 0.388	(3.434 0.012 0.258) $\times 10^1$	(1.482 0.039 0.041) $\times 10^{-1}$
4.02 – 4.43	3.972 0.103 0.303	(2.763 0.009 0.208) $\times 10^1$	(1.437 0.038 0.040) $\times 10^{-1}$
4.43 – 4.88	3.206 0.082 0.244	(2.272 0.008 0.171) $\times 10^1$	(1.411 0.036 0.039) $\times 10^{-1}$
4.88 – 5.37	2.524 0.064 0.192	(1.898 0.006 0.143) $\times 10^1$	(1.330 0.034 0.037) $\times 10^{-1}$
5.37 – 5.90	2.018 0.052 0.154	(1.537 0.005 0.116) $\times 10^1$	(1.313 0.034 0.036) $\times 10^{-1}$
5.90 – 6.47	1.597 0.042 0.122	(1.236 0.004 0.093) $\times 10^1$	(1.291 0.035 0.036) $\times 10^{-1}$
6.47 – 7.09	1.308 0.036 0.100	(1.004 0.003 0.076) $\times 10^1$	(1.303 0.036 0.036) $\times 10^{-1}$
7.09 – 7.76	1.031 0.013 0.037	8.488 0.016 0.280	(1.215 0.015 0.032) $\times 10^{-1}$
7.76 – 8.48	(8.045 0.099 0.287) $\times 10^{-1}$	6.826 0.011 0.225	(1.179 0.015 0.031) $\times 10^{-1}$
8.48 – 9.26	(6.430 0.081 0.230) $\times 10^{-1}$	5.517 0.009 0.182	(1.165 0.015 0.031) $\times 10^{-1}$
9.26 – 10.10	(5.186 0.068 0.186) $\times 10^{-1}$	4.481 0.007 0.148	(1.157 0.015 0.030) $\times 10^{-1}$
10.10 – 11.00	(4.111 0.057 0.147) $\times 10^{-1}$	3.614 0.006 0.119	(1.138 0.016 0.030) $\times 10^{-1}$
11.00 – 12.00	(3.303 0.048 0.118) $\times 10^{-1}$	2.934 0.005 0.097	(1.126 0.016 0.029) $\times 10^{-1}$
12.00 – 13.00	(2.554 0.041 0.093) $\times 10^{-1}$	2.387 0.004 0.079	(1.070 0.017 0.029) $\times 10^{-1}$
13.00 – 14.10	(2.000 0.034 0.094) $\times 10^{-1}$	1.964 0.003 0.065	(1.018 0.017 0.045) $\times 10^{-1}$
14.10 – 15.30	(1.584 0.029 0.088) $\times 10^{-1}$	1.606 0.003 0.054	(9.858 0.181 0.572) $\times 10^{-2}$
15.30 – 16.60	– – –	1.322 0.002 0.048	– – –
16.60 – 18.00	– – –	1.043 0.002 0.041	– – –
18.00 – 19.50	– – –	(8.456 0.017 0.360) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.760 0.015 0.297) $\times 10^{-1}$	– – –

TABLE SM XX. The ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2506 to 2509 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{3\text{He}}/\Phi_{4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.412 0.017 0.068) $\times 10^1$	– – –	– – –
2.15 – 2.40	(1.202 0.014 0.058) $\times 10^1$	(7.533 0.009 0.280) $\times 10^1$	(1.596 0.019 0.062) $\times 10^{-1}$
2.40 – 2.67	(1.026 0.028 0.078) $\times 10^1$	(6.675 0.007 0.255) $\times 10^1$	(1.537 0.042 0.078) $\times 10^{-1}$
2.67 – 2.97	9.072 0.234 0.667	(5.618 0.006 0.236) $\times 10^1$	(1.615 0.042 0.081) $\times 10^{-1}$
2.97 – 3.29	7.386 0.191 0.543	(4.815 0.005 0.262) $\times 10^1$	(1.534 0.040 0.099) $\times 10^{-1}$
3.29 – 3.64	5.742 0.147 0.422	(3.920 0.014 0.284) $\times 10^1$	(1.465 0.038 0.041) $\times 10^{-1}$
3.64 – 4.02	4.905 0.125 0.361	(3.335 0.011 0.242) $\times 10^1$	(1.471 0.038 0.041) $\times 10^{-1}$
4.02 – 4.43	3.987 0.101 0.293	(2.784 0.009 0.202) $\times 10^1$	(1.432 0.037 0.039) $\times 10^{-1}$
4.43 – 4.88	3.153 0.079 0.232	(2.219 0.007 0.161) $\times 10^1$	(1.421 0.036 0.039) $\times 10^{-1}$
4.88 – 5.37	2.536 0.063 0.186	(1.914 0.006 0.139) $\times 10^1$	(1.325 0.033 0.037) $\times 10^{-1}$
5.37 – 5.90	1.983 0.050 0.146	(1.494 0.005 0.108) $\times 10^1$	(1.327 0.034 0.037) $\times 10^{-1}$
5.90 – 6.47	1.609 0.042 0.118	(1.215 0.004 0.088) $\times 10^1$	(1.324 0.035 0.037) $\times 10^{-1}$
6.47 – 7.09	1.268 0.034 0.093	(1.009 0.003 0.073) $\times 10^1$	(1.256 0.034 0.035) $\times 10^{-1}$
7.09 – 7.76	1.010 0.012 0.037	8.182 0.015 0.275	(1.234 0.015 0.032) $\times 10^{-1}$
7.76 – 8.48	(8.090 0.098 0.292) $\times 10^{-1}$	6.703 0.011 0.225	(1.207 0.015 0.031) $\times 10^{-1}$
8.48 – 9.26	(6.426 0.080 0.233) $\times 10^{-1}$	5.461 0.008 0.183	(1.177 0.015 0.031) $\times 10^{-1}$
9.26 – 10.10	(5.140 0.066 0.186) $\times 10^{-1}$	4.445 0.007 0.149	(1.156 0.015 0.030) $\times 10^{-1}$
10.10 – 11.00	(4.113 0.056 0.149) $\times 10^{-1}$	3.573 0.005 0.120	(1.151 0.016 0.030) $\times 10^{-1}$
11.00 – 12.00	(3.265 0.046 0.118) $\times 10^{-1}$	2.927 0.004 0.098	(1.116 0.016 0.029) $\times 10^{-1}$
12.00 – 13.00	(2.554 0.040 0.094) $\times 10^{-1}$	2.379 0.004 0.080	(1.074 0.017 0.029) $\times 10^{-1}$
13.00 – 14.10	(2.023 0.034 0.096) $\times 10^{-1}$	1.939 0.003 0.065	(1.043 0.017 0.046) $\times 10^{-1}$
14.10 – 15.30	(1.581 0.028 0.088) $\times 10^{-1}$	1.606 0.003 0.055	(9.842 0.177 0.570) $\times 10^{-2}$
15.30 – 16.60	– – –	1.294 0.002 0.048	– – –
16.60 – 18.00	– – –	1.057 0.002 0.042	– – –
18.00 – 19.50	– – –	(8.460 0.017 0.364) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.751 0.015 0.299) $\times 10^{-1}$	– – –

TABLE SM XXI. The ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, for the time period including Bartels rotation from 2510 to 2513 including errors due to statistical (stat) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$ σ_{stat} σ_{sys}
1.92 – 2.15	(1.302 0.017 0.065) $\times 10^1$	– – –	– – –
2.15 – 2.40	(1.101 0.014 0.055) $\times 10^1$	(6.915 0.009 0.267) $\times 10^1$	(1.592 0.020 0.062) $\times 10^{-1}$
2.40 – 2.67	9.372 0.270 0.719	(6.064 0.007 0.240) $\times 10^1$	(1.546 0.045 0.078) $\times 10^{-1}$
2.67 – 2.97	8.096 0.221 0.603	(5.277 0.006 0.228) $\times 10^1$	(1.534 0.042 0.077) $\times 10^{-1}$
2.97 – 3.29	6.935 0.189 0.517	(4.494 0.005 0.249) $\times 10^1$	(1.543 0.042 0.099) $\times 10^{-1}$
3.29 – 3.64	5.824 0.155 0.434	(3.724 0.014 0.274) $\times 10^1$	(1.564 0.042 0.043) $\times 10^{-1}$
3.64 – 4.02	4.643 0.123 0.346	(3.166 0.011 0.233) $\times 10^1$	(1.467 0.039 0.041) $\times 10^{-1}$
4.02 – 4.43	3.803 0.100 0.283	(2.630 0.009 0.193) $\times 10^1$	(1.446 0.038 0.040) $\times 10^{-1}$
4.43 – 4.88	3.084 0.080 0.230	(2.214 0.008 0.163) $\times 10^1$	(1.393 0.036 0.038) $\times 10^{-1}$
4.88 – 5.37	2.431 0.062 0.181	(1.815 0.006 0.133) $\times 10^1$	(1.339 0.035 0.037) $\times 10^{-1}$
5.37 – 5.90	1.916 0.050 0.143	(1.452 0.005 0.107) $\times 10^1$	(1.320 0.035 0.036) $\times 10^{-1}$
5.90 – 6.47	1.564 0.042 0.117	(1.182 0.004 0.087) $\times 10^1$	(1.324 0.036 0.037) $\times 10^{-1}$
6.47 – 7.09	1.259 0.035 0.094	9.649 0.032 0.709	(1.305 0.036 0.036) $\times 10^{-1}$
7.09 – 7.76	1.002 0.012 0.037	8.022 0.015 0.273	(1.249 0.015 0.033) $\times 10^{-1}$
7.76 – 8.48	(8.005 0.099 0.293) $\times 10^{-1}$	6.557 0.011 0.223	(1.221 0.015 0.032) $\times 10^{-1}$
8.48 – 9.26	(6.345 0.081 0.233) $\times 10^{-1}$	5.353 0.008 0.182	(1.185 0.015 0.031) $\times 10^{-1}$
9.26 – 10.10	(5.018 0.066 0.185) $\times 10^{-1}$	4.352 0.007 0.148	(1.153 0.015 0.030) $\times 10^{-1}$
10.10 – 11.00	(4.022 0.056 0.148) $\times 10^{-1}$	3.525 0.005 0.120	(1.141 0.016 0.030) $\times 10^{-1}$
11.00 – 12.00	(3.196 0.046 0.117) $\times 10^{-1}$	2.888 0.004 0.098	(1.107 0.016 0.029) $\times 10^{-1}$
12.00 – 13.00	(2.504 0.040 0.093) $\times 10^{-1}$	2.314 0.004 0.079	(1.082 0.017 0.030) $\times 10^{-1}$
13.00 – 14.10	(1.981 0.034 0.094) $\times 10^{-1}$	1.896 0.003 0.065	(1.044 0.018 0.046) $\times 10^{-1}$
14.10 – 15.30	(1.584 0.029 0.089) $\times 10^{-1}$	1.572 0.003 0.055	(1.008 0.019 0.058) $\times 10^{-1}$
15.30 – 16.60	– – –	1.275 0.002 0.047	– – –
16.60 – 18.00	– – –	1.023 0.002 0.041	– – –
18.00 – 19.50	– – –	(8.357 0.017 0.362) $\times 10^{-1}$	– – –
19.50 – 21.10	– – –	(6.755 0.015 0.302) $\times 10^{-1}$	– – –

TABLE SM XXII. The time-averaged ^3He and ^4He fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GV}]^{-1}$, and their ratio, as functions of rigidity at the top of AMS, including statistical (stat.) and systematic (sys.) errors.

R (GV)	$\Phi_{^3\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}	$\Phi_{^3\text{He}}/\Phi_{^4\text{He}}$	σ_{stat}	σ_{sys}
1.92 – 2.15	9.632	0.027	0.404	–	–	–	–	–	–
2.15 – 2.40	8.524	0.024	0.358	(5.111 0.001 0.144) $\times 10^1$	(1.668 0.005 0.065) $\times 10^{-1}$				
2.40 – 2.67	7.455	0.047	0.334	(4.633 0.001 0.136) $\times 10^1$	(1.609 0.010 0.061) $\times 10^{-1}$				
2.67 – 2.97	6.670	0.040	0.272	(4.185 0.001 0.143) $\times 10^1$	(1.594 0.010 0.059) $\times 10^{-1}$				
2.97 – 3.29	5.777	0.034	0.235	(3.691 0.001 0.179) $\times 10^1$	(1.565 0.009 0.085) $\times 10^{-1}$				
3.29 – 3.64	4.891	0.028	0.199	(3.206 0.002 0.124) $\times 10^1$	(1.526 0.009 0.042) $\times 10^{-1}$				
3.64 – 4.02	4.136	0.024	0.169	(2.755 0.002 0.107) $\times 10^1$	(1.501 0.009 0.041) $\times 10^{-1}$				
4.02 – 4.43	3.414	0.019	0.139	(2.343 0.002 0.091) $\times 10^1$	(1.458 0.008 0.040) $\times 10^{-1}$				
4.43 – 4.88	2.833	0.016	0.115	(1.989 0.001 0.077) $\times 10^1$	(1.425 0.008 0.039) $\times 10^{-1}$				
4.88 – 5.37	2.232	0.012	0.091	(1.654 0.001 0.064) $\times 10^1$	(1.349 0.007 0.037) $\times 10^{-1}$				
5.37 – 5.90	1.801	0.010	0.073	(1.355 0.001 0.053) $\times 10^1$	(1.330 0.007 0.037) $\times 10^{-1}$				
5.90 – 6.47	1.459	0.008	0.059	(1.130 0.001 0.044) $\times 10^1$	(1.291 0.007 0.036) $\times 10^{-1}$				
6.47 – 7.09	1.182	0.007	0.048	9.299 0.006 0.361	(1.271 0.008 0.035) $\times 10^{-1}$				
7.09 – 7.76	(9.518 0.025 0.239) $\times 10^{-1}$			7.723 0.003 0.162	(1.232 0.003 0.032) $\times 10^{-1}$				
7.76 – 8.48	(7.678 0.020 0.191) $\times 10^{-1}$			6.375 0.002 0.134	(1.204 0.003 0.031) $\times 10^{-1}$				
8.48 – 9.26	(6.083 0.016 0.153) $\times 10^{-1}$			5.198 0.002 0.109	(1.170 0.003 0.031) $\times 10^{-1}$				
9.26 – 10.10	(4.849 0.014 0.122) $\times 10^{-1}$			4.236 0.001 0.089	(1.145 0.003 0.030) $\times 10^{-1}$				
10.10 – 11.00	(3.865 0.011 0.097) $\times 10^{-1}$			3.487 0.001 0.073	(1.108 0.003 0.029) $\times 10^{-1}$				
11.00 – 12.00	(3.085 0.009 0.077) $\times 10^{-1}$			2.853 0.001 0.060	(1.081 0.003 0.028) $\times 10^{-1}$				
12.00 – 13.00	(2.446 0.008 0.063) $\times 10^{-1}$			2.308 0.001 0.048	(1.059 0.004 0.029) $\times 10^{-1}$				
13.00 – 14.10	(1.938 0.007 0.076) $\times 10^{-1}$			1.895 0.001 0.040	(1.023 0.004 0.045) $\times 10^{-1}$				
14.10 – 15.30	(1.509 0.006 0.075) $\times 10^{-1}$			1.558 0.001 0.035	(9.689 0.037 0.562) $\times 10^{-2}$				
15.30 – 16.60	–	–	–	1.280 0.001 0.033	–	–	–	–	–
16.60 – 18.00	–	–	–	1.042 0.001 0.031	–	–	–	–	–
18.00 – 19.50	–	–	–	(8.448 0.004 0.288) $\times 10^{-1}$	–	–	–	–	–
19.50 – 21.10	–	–	–	(6.758 0.003 0.241) $\times 10^{-1}$	–	–	–	–	–

TABLE SM XXIII. The time-averaged ${}^3\text{He}$ and ${}^4\text{He}$ fluxes in units of $[\text{m}^2 \cdot \text{sr} \cdot \text{s} \cdot \text{GeV}/\text{n}]^{-1}$, and their ratio, as functions of kinetic energy per nucleon at the top of AMS, including statistical (stat.) and systematic (sys.) errors.

E_K (GeV/n)	$\Phi_{{}^3\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{{}^4\text{He}}$ σ_{stat} σ_{sys}	$\Phi_{{}^3\text{He}}/\Phi_{{}^4\text{He}}$ σ_{stat} σ_{sys}
0.50 – 0.56	(2.049 0.009 0.077) $\times 10^1$	(1.311 0.001 0.047) $\times 10^2$	(1.563 0.007 0.098) $\times 10^{-1}$
0.56 – 0.63	(1.979 0.008 0.060) $\times 10^1$	(1.237 0.001 0.035) $\times 10^2$	(1.600 0.006 0.070) $\times 10^{-1}$
0.63 – 0.71	(1.771 0.007 0.054) $\times 10^1$	(1.100 0.001 0.031) $\times 10^2$	(1.610 0.006 0.071) $\times 10^{-1}$
0.71 – 0.79	(1.621 0.006 0.049) $\times 10^1$	(9.911 0.003 0.281) $\times 10^1$	(1.635 0.006 0.072) $\times 10^{-1}$
0.79 – 0.89	(1.383 0.005 0.050) $\times 10^1$	(8.349 0.003 0.236) $\times 10^1$	(1.656 0.006 0.074) $\times 10^{-1}$
0.89 – 1.00	(1.291 0.010 0.045) $\times 10^1$	(7.674 0.007 0.255) $\times 10^1$	(1.683 0.013 0.045) $\times 10^{-1}$
1.00 – 1.12	(1.231 0.009 0.043) $\times 10^1$	(7.140 0.006 0.237) $\times 10^1$	(1.724 0.012 0.046) $\times 10^{-1}$
1.12 – 1.26	(1.095 0.007 0.038) $\times 10^1$	(6.184 0.005 0.205) $\times 10^1$	(1.770 0.012 0.048) $\times 10^{-1}$
1.26 – 1.41	9.622 0.064 0.337	(5.350 0.004 0.178) $\times 10^1$	(1.798 0.012 0.048) $\times 10^{-1}$
1.41 – 1.58	8.313 0.053 0.338	(4.566 0.004 0.152) $\times 10^1$	(1.821 0.012 0.051) $\times 10^{-1}$
1.58 – 1.78	7.177 0.045 0.292	(3.915 0.003 0.130) $\times 10^1$	(1.833 0.011 0.051) $\times 10^{-1}$
1.78 – 2.00	6.047 0.037 0.246	(3.221 0.002 0.125) $\times 10^1$	(1.878 0.011 0.052) $\times 10^{-1}$
2.00 – 2.24	5.085 0.030 0.207	(2.691 0.002 0.105) $\times 10^1$	(1.889 0.011 0.052) $\times 10^{-1}$
2.24 – 2.51	4.200 0.024 0.171	(2.229 0.002 0.087) $\times 10^1$	(1.884 0.011 0.052) $\times 10^{-1}$
2.51 – 2.82	3.322 0.019 0.135	(1.832 0.001 0.071) $\times 10^1$	(1.813 0.010 0.050) $\times 10^{-1}$
2.82 – 3.16	2.687 0.015 0.119	(1.487 0.001 0.063) $\times 10^1$	(1.806 0.010 0.080) $\times 10^{-1}$
3.16 – 3.55	2.125 0.006 0.050	(1.206 0.001 0.023) $\times 10^1$	(1.762 0.005 0.045) $\times 10^{-1}$
3.55 – 3.98	1.711 0.004 0.040	9.757 0.003 0.183	(1.754 0.005 0.045) $\times 10^{-1}$
3.98 – 4.47	1.374 0.003 0.034	7.761 0.002 0.152	(1.771 0.004 0.046) $\times 10^{-1}$
4.47 – 5.01	1.072 0.003 0.027	6.190 0.002 0.121	(1.732 0.004 0.045) $\times 10^{-1}$
5.01 – 5.62	(8.223 0.021 0.204) $\times 10^{-1}$	4.810 0.001 0.101	(1.710 0.004 0.044) $\times 10^{-1}$
5.62 – 6.31	(6.298 0.017 0.158) $\times 10^{-1}$	3.748 0.001 0.079	(1.680 0.004 0.044) $\times 10^{-1}$
6.31 – 7.08	(4.827 0.013 0.120) $\times 10^{-1}$	2.932 0.001 0.065	(1.646 0.005 0.046) $\times 10^{-1}$
7.08 – 7.94	(3.620 0.011 0.090) $\times 10^{-1}$	2.269 0.001 0.060	(1.595 0.005 0.054) $\times 10^{-1}$
7.94 – 8.91	(2.669 0.009 0.087) $\times 10^{-1}$	1.731 0.001 0.059	(1.542 0.005 0.084) $\times 10^{-1}$
8.91 – 10.00	(1.885 0.007 0.071) $\times 10^{-1}$	1.284 0.001 0.046	(1.468 0.005 0.092) $\times 10^{-1}$