

SPENVIS 4.6.7.2923 29-Jan-2014 18:24:50

Trapped particle fluxes

Project: RODRIGO

Rodrigo's Magic Flying Ship

Contents[Trapped protons](#)[Integral spectra](#)[Differential spectra](#)[Exposures](#)[Peak fluxes](#)[Trapped electrons](#)[Integral spectra](#)[Differential spectra](#)[Exposures](#)[Peak fluxes](#)**Trapped proton model: AP-8 MIN**

Internal magnetic field model: Jensen & Cain 1960 updated to 1960.0

External magnetic field model: None

Integral proton spectra

| Energy (MeV) | Total mission average flux (/cm ² /s) | Total mission fluence (/cm ²) | Mission segment 1 | |
|--------------|--|---|------------------------------------|-------------------------------------|
| | | | Average flux (/cm ² /s) | Segment fluence (/cm ²) |
| 0.10 | 1.1974E+02 | 3.7762E+09 | 1.1974E+02 | 3.7762E+09 |
| 0.15 | 1.1927E+02 | 3.7612E+09 | 1.1927E+02 | 3.7612E+09 |
| 0.20 | 1.1879E+02 | 3.7463E+09 | 1.1879E+02 | 3.7463E+09 |
| 0.30 | 1.1827E+02 | 3.7299E+09 | 1.1827E+02 | 3.7299E+09 |

| | | | | |
|--------|------------|------------|------------|------------|
| 0.40 | 1.1776E+02 | 3.7136E+09 | 1.1776E+02 | 3.7136E+09 |
| 0.50 | 1.1714E+02 | 3.6941E+09 | 1.1714E+02 | 3.6941E+09 |
| 0.60 | 1.1652E+02 | 3.6746E+09 | 1.1652E+02 | 3.6746E+09 |
| 0.70 | 1.1609E+02 | 3.6609E+09 | 1.1609E+02 | 3.6609E+09 |
| 1.00 | 1.1469E+02 | 3.6169E+09 | 1.1469E+02 | 3.6169E+09 |
| 1.50 | 1.1396E+02 | 3.5939E+09 | 1.1396E+02 | 3.5939E+09 |
| 2.00 | 1.1324E+02 | 3.5712E+09 | 1.1324E+02 | 3.5712E+09 |
| 3.00 | 1.1216E+02 | 3.5372E+09 | 1.1216E+02 | 3.5372E+09 |
| 4.00 | 1.1110E+02 | 3.5038E+09 | 1.1110E+02 | 3.5038E+09 |
| 5.00 | 1.1000E+02 | 3.4690E+09 | 1.1000E+02 | 3.4690E+09 |
| 6.00 | 1.0886E+02 | 3.4331E+09 | 1.0886E+02 | 3.4331E+09 |
| 7.00 | 1.0754E+02 | 3.3914E+09 | 1.0754E+02 | 3.3914E+09 |
| 10.00 | 1.0377E+02 | 3.2725E+09 | 1.0377E+02 | 3.2725E+09 |
| 15.00 | 9.9055E+01 | 3.1238E+09 | 9.9055E+01 | 3.1238E+09 |
| 20.00 | 9.4402E+01 | 2.9771E+09 | 9.4402E+01 | 2.9771E+09 |
| 30.00 | 8.7231E+01 | 2.7509E+09 | 8.7231E+01 | 2.7509E+09 |
| 40.00 | 8.0113E+01 | 2.5265E+09 | 8.0113E+01 | 2.5265E+09 |
| 50.00 | 7.3636E+01 | 2.3222E+09 | 7.3636E+01 | 2.3222E+09 |
| 60.00 | 6.7049E+01 | 2.1145E+09 | 6.7049E+01 | 2.1145E+09 |
| 70.00 | 6.0959E+01 | 1.9224E+09 | 6.0959E+01 | 1.9224E+09 |
| 100.00 | 4.5457E+01 | 1.4335E+09 | 4.5457E+01 | 1.4335E+09 |
| 150.00 | 2.7015E+01 | 8.5193E+08 | 2.7015E+01 | 8.5193E+08 |
| 200.00 | 1.6212E+01 | 5.1127E+08 | 1.6212E+01 | 5.1127E+08 |
| 300.00 | 5.6986E+00 | 1.7971E+08 | 5.6986E+00 | 1.7971E+08 |
| 400.00 | 2.0318E+00 | 6.4075E+07 | 2.0318E+00 | 6.4075E+07 |

Differential proton spectra

| Energy (MeV) | Total mission average flux (/cm ² /MeV/s) | Total mission fluence (/cm ² /MeV) | Mission segment 1 | |
|--------------|--|---|--|---|
| | | | Average flux (/cm ² /MeV/s) | Segment fluence (/cm ² /MeV) |
| 0.10 | 9.5517E+00 | 3.0122E+08 | 9.5517E+00 | 3.0122E+08 |
| 0.15 | 9.4991E+00 | 2.9956E+08 | 9.4991E+00 | 2.9956E+08 |
| 0.20 | 8.0467E+00 | 2.5376E+08 | 8.0467E+00 | 2.5376E+08 |
| 0.30 | 5.1769E+00 | 1.6326E+08 | 5.1769E+00 | 1.6326E+08 |

| | | | | |
|--------|------------|------------|------------|------------|
| 0.40 | 5.6800E+00 | 1.7912E+08 | 5.6800E+00 | 1.7912E+08 |
| 0.50 | 6.1812E+00 | 1.9493E+08 | 6.1812E+00 | 1.9493E+08 |
| 0.60 | 5.2551E+00 | 1.6573E+08 | 5.2551E+00 | 1.6573E+08 |
| 0.70 | 4.4244E+00 | 1.3953E+08 | 4.4244E+00 | 1.3953E+08 |
| 1.00 | 3.4532E+00 | 1.0890E+08 | 3.4532E+00 | 1.0890E+08 |
| 1.50 | 1.4505E+00 | 4.5742E+07 | 1.4505E+00 | 4.5742E+07 |
| 2.00 | 1.3223E+00 | 4.1699E+07 | 1.3223E+00 | 4.1699E+07 |
| 3.00 | 1.0684E+00 | 3.3692E+07 | 1.0684E+00 | 3.3692E+07 |
| 4.00 | 1.0817E+00 | 3.4112E+07 | 1.0817E+00 | 3.4112E+07 |
| 5.00 | 1.1210E+00 | 3.5351E+07 | 1.1210E+00 | 3.5351E+07 |
| 6.00 | 1.2300E+00 | 3.8788E+07 | 1.2300E+00 | 3.8788E+07 |
| 7.00 | 1.3051E+00 | 4.1158E+07 | 1.3051E+00 | 4.1158E+07 |
| 10.00 | 1.1392E+00 | 3.5925E+07 | 1.1392E+00 | 3.5925E+07 |
| 15.00 | 9.3685E-01 | 2.9545E+07 | 9.3685E-01 | 2.9545E+07 |
| 20.00 | 8.5944E-01 | 2.7103E+07 | 8.5944E-01 | 2.7103E+07 |
| 30.00 | 7.1443E-01 | 2.2530E+07 | 7.1443E-01 | 2.2530E+07 |
| 40.00 | 6.7974E-01 | 2.1436E+07 | 6.7974E-01 | 2.1436E+07 |
| 50.00 | 6.5322E-01 | 2.0600E+07 | 6.5322E-01 | 2.0600E+07 |
| 60.00 | 6.3389E-01 | 1.9990E+07 | 6.3389E-01 | 1.9990E+07 |
| 70.00 | 5.8595E-01 | 1.8479E+07 | 5.8595E-01 | 1.8479E+07 |
| 100.00 | 4.6127E-01 | 1.4546E+07 | 4.6127E-01 | 1.4546E+07 |
| 150.00 | 2.9245E-01 | 9.2227E+06 | 2.9245E-01 | 9.2227E+06 |
| 200.00 | 1.7908E-01 | 5.6474E+06 | 1.7908E-01 | 5.6474E+06 |
| 300.00 | 7.0902E-02 | 2.2360E+06 | 7.0902E-02 | 2.2360E+06 |
| 400.00 | 2.4346E-03 | 7.6777E+04 | 2.4346E-03 | 7.6777E+04 |

Trapped electron model: AE-8 MIN

Internal magnetic field model: Jensen & Cain 1960 updated to 1960.0

External magnetic field model: None

Local time variation is not taken into account

Probability that fluxes will not be exceeded (AE-4): 50.0%

Integral electron spectra

| Energy (MeV) | Total mission average flux (/cm ² /s) | Total mission fluence (/cm ²) | Mission segment 1 | |
|--------------|--|---|------------------------------------|-------------------------------------|
| | | | Average flux (/cm ² /s) | Segment fluence (/cm ²) |
| 4.0E-02 | 6.4061E+04 | 2.0202E+12 | 6.4061E+04 | 2.0202E+12 |
| 0.10 | 4.0792E+04 | 1.2864E+12 | 4.0792E+04 | 1.2864E+12 |
| 0.20 | 1.3188E+04 | 4.1589E+11 | 1.3188E+04 | 4.1589E+11 |
| 0.30 | 5.3712E+03 | 1.6939E+11 | 5.3712E+03 | 1.6939E+11 |
| 0.40 | 2.7204E+03 | 8.5792E+10 | 2.7204E+03 | 8.5792E+10 |
| 0.50 | 1.3851E+03 | 4.3680E+10 | 1.3851E+03 | 4.3680E+10 |
| 0.60 | 9.1138E+02 | 2.8741E+10 | 9.1138E+02 | 2.8741E+10 |
| 0.70 | 6.0309E+02 | 1.9019E+10 | 6.0309E+02 | 1.9019E+10 |
| 0.80 | 4.2960E+02 | 1.3548E+10 | 4.2960E+02 | 1.3548E+10 |
| 1.00 | 2.5103E+02 | 7.9164E+09 | 2.5103E+02 | 7.9164E+09 |
| 1.25 | 1.5366E+02 | 4.8459E+09 | 1.5366E+02 | 4.8459E+09 |
| 1.50 | 9.4295E+01 | 2.9737E+09 | 9.4295E+01 | 2.9737E+09 |
| 1.75 | 6.2800E+01 | 1.9805E+09 | 6.2800E+01 | 1.9805E+09 |
| 2.00 | 4.1866E+01 | 1.3203E+09 | 4.1866E+01 | 1.3203E+09 |
| 2.25 | 2.8456E+01 | 8.9739E+08 | 2.8456E+01 | 8.9739E+08 |
| 2.50 | 1.9362E+01 | 6.1060E+08 | 1.9362E+01 | 6.1060E+08 |
| 2.75 | 7.8857E+00 | 2.4868E+08 | 7.8857E+00 | 2.4868E+08 |
| 3.00 | 3.2624E+00 | 1.0288E+08 | 3.2624E+00 | 1.0288E+08 |
| 3.25 | 9.9381E-01 | 3.1341E+07 | 9.9381E-01 | 3.1341E+07 |
| 3.50 | 3.0409E-01 | 9.5899E+06 | 3.0409E-01 | 9.5899E+06 |
| 3.75 | 9.3655E-02 | 2.9535E+06 | 9.3655E-02 | 2.9535E+06 |
| 4.00 | 1.4345E-02 | 4.5239E+05 | 1.4345E-02 | 4.5239E+05 |
| 4.25 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 4.50 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 4.75 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 5.00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 5.50 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 6.00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 6.50 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 7.00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |

Differential electron spectra

| Energy (MeV) | Total mission average flux (/cm ² /MeV/s) | Total mission fluence (/cm ² /MeV) | Mission segment 1 | |
|--------------|--|---|--|---|
| | | | Average flux (/cm ² /MeV/s) | Segment fluence (/cm ² /MeV) |
| 4.0E-02 | 4.2973E+05 | 1.3552E+13 | 4.2973E+05 | 1.3552E+13 |
| 0.10 | 3.4590E+05 | 1.0908E+13 | 3.4590E+05 | 1.0908E+13 |
| 0.20 | 1.7710E+05 | 5.5852E+12 | 1.7710E+05 | 5.5852E+12 |
| 0.30 | 5.2337E+04 | 1.6505E+12 | 5.2337E+04 | 1.6505E+12 |
| 0.40 | 1.9931E+04 | 6.2853E+11 | 1.9931E+04 | 6.2853E+11 |
| 0.50 | 9.0453E+03 | 2.8525E+11 | 9.0453E+03 | 2.8525E+11 |
| 0.60 | 3.9100E+03 | 1.2330E+11 | 3.9100E+03 | 1.2330E+11 |
| 0.70 | 2.4089E+03 | 7.5966E+10 | 2.4089E+03 | 7.5966E+10 |
| 0.80 | 1.4542E+03 | 4.5859E+10 | 1.4542E+03 | 4.5859E+10 |
| 1.00 | 6.6913E+02 | 2.1102E+10 | 6.6913E+02 | 2.1102E+10 |
| 1.25 | 3.1346E+02 | 9.8854E+09 | 3.1346E+02 | 9.8854E+09 |
| 1.50 | 1.8172E+02 | 5.7308E+09 | 1.8172E+02 | 5.7308E+09 |
| 1.75 | 1.0486E+02 | 3.3068E+09 | 1.0486E+02 | 3.3068E+09 |
| 2.00 | 6.8688E+01 | 2.1661E+09 | 6.8688E+01 | 2.1661E+09 |
| 2.25 | 4.5008E+01 | 1.4194E+09 | 4.5008E+01 | 1.4194E+09 |
| 2.50 | 4.1141E+01 | 1.2974E+09 | 4.1141E+01 | 1.2974E+09 |
| 2.75 | 3.2199E+01 | 1.0154E+09 | 3.2199E+01 | 1.0154E+09 |
| 3.00 | 1.3784E+01 | 4.3468E+08 | 1.3784E+01 | 4.3468E+08 |
| 3.25 | 5.9166E+00 | 1.8659E+08 | 5.9166E+00 | 1.8659E+08 |
| 3.50 | 1.8003E+00 | 5.6774E+07 | 1.8003E+00 | 5.6774E+07 |
| 3.75 | 5.7950E-01 | 1.8275E+07 | 5.7950E-01 | 1.8275E+07 |
| 4.00 | 1.8731E-01 | 5.9070E+06 | 1.8731E-01 | 5.9070E+06 |
| 4.25 | 2.8690E-02 | 9.0478E+05 | 2.8690E-02 | 9.0478E+05 |
| 4.50 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 4.75 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 5.00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 5.50 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 6.00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 6.50 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 7.00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |

**Exposure for proton flux exceeding threshold
1.00 /cm2/s**

| Energy (MeV) | Total exposure (hr) | <u>Mission segment 1</u> | |
|-----------------|---------------------------|--------------------------|----------------|
| | | Exposure time (hr) | Orbit fraction |
| 0.10 | 1088.92 | 1088.92 | 0.1243 |
| 0.15 | 1088.92 | 1088.92 | 0.1243 |
| 0.20 | 1088.92 | 1088.92 | 0.1243 |
| 0.30 | 1082.83 | 1082.83 | 0.1236 |
| 0.40 | 1082.83 | 1082.83 | 0.1236 |
| 0.50 | 1082.83 | 1082.83 | 0.1236 |
| 0.60 | 1082.83 | 1082.83 | 0.1236 |
| 0.70 | 1082.83 | 1082.83 | 0.1236 |
| 1.00 | 1082.83 | 1082.83 | 0.1236 |
| 1.50 | 1082.83 | 1082.83 | 0.1236 |
| 2.00 | 1076.75 | 1076.75 | 0.1229 |
| 3.00 | 1070.67 | 1070.67 | 0.1222 |
| 4.00 | 1070.67 | 1070.67 | 0.1222 |
| 5.00 | 1070.67 | 1070.67 | 0.1222 |
| 6.00 | 1070.67 | 1070.67 | 0.1222 |
| 7.00 | 1070.67 | 1070.67 | 0.1222 |
| 10.00 | 1064.58 | 1064.58 | 0.1215 |
| 15.00 | 1064.58 | 1064.58 | 0.1215 |
| 20.00 | 1058.50 | 1058.50 | 0.1208 |
| 30.00 | 1046.33 | 1046.33 | 0.1194 |
| 40.00 | 1046.33 | 1046.33 | 0.1194 |
| 50.00 | 1009.83 | 1009.83 | 0.1153 |
| 60.00 | 1003.75 | 1003.75 | 0.1146 |
| 70.00 | 1003.75 | 1003.75 | 0.1146 |
| 100.00 | 930.75 | 930.75 | 0.1062 |
| 150.00 | 833.42 | 833.42 | 0.0951 |
| 200.00 | 760.42 | 760.42 | 0.0868 |
| 300.00 | 699.58 | 699.58 | 0.0799 |
| 400.00 | 596.17 | 596.17 | 0.0681 |

**Exposure for electron flux exceeding threshold
1.00 /cm²/s**

| Energy (MeV) | Total exposure (hr) | <u>Mission segment 1</u> | |
|-----------------|---------------------------|--------------------------|----------------|
| | | Exposure time (hr) | Orbit fraction |
| 0.04 | 1143.67 | 1143.67 | 0.1306 |
| 0.10 | 1143.67 | 1143.67 | 0.1306 |
| 0.20 | 1131.50 | 1131.50 | 0.1292 |
| 0.30 | 1101.08 | 1101.08 | 0.1257 |
| 0.40 | 1076.75 | 1076.75 | 0.1229 |
| 0.50 | 1052.42 | 1052.42 | 0.1201 |
| 0.60 | 1015.92 | 1015.92 | 0.1160 |
| 0.70 | 1015.92 | 1015.92 | 0.1160 |
| 0.80 | 1009.83 | 1009.83 | 0.1153 |
| 1.00 | 997.67 | 997.67 | 0.1139 |
| 1.25 | 961.17 | 961.17 | 0.1097 |
| 1.50 | 955.08 | 955.08 | 0.1090 |
| 1.75 | 936.83 | 936.83 | 0.1069 |
| 2.00 | 936.83 | 936.83 | 0.1069 |
| 2.25 | 912.50 | 912.50 | 0.1042 |
| 2.50 | 869.92 | 869.92 | 0.0993 |
| 2.75 | 815.17 | 815.17 | 0.0931 |
| 3.00 | 751.29 | 751.29 | 0.0858 |
| 3.25 | 641.79 | 641.79 | 0.0733 |
| 3.50 | 486.67 | 486.67 | 0.0556 |
| 3.75 | 352.83 | 352.83 | 0.0403 |
| 4.00 | 85.17 | 85.17 | 0.0097 |
| 4.25 | 0.00 | 0.00 | 0.0000 |
| 4.50 | 0.00 | 0.00 | 0.0000 |
| 4.75 | 0.00 | 0.00 | 0.0000 |
| 5.00 | 0.00 | 0.00 | 0.0000 |
| 5.50 | 0.00 | 0.00 | 0.0000 |
| 6.00 | 0.00 | 0.00 | 0.0000 |
| 6.50 | 0.00 | 0.00 | 0.0000 |

| | | | |
|------|------|------|--------|
| 7.00 | 0.00 | 0.00 | 0.0000 |
|------|------|------|--------|

Integral peak proton flux (/cm²/s); click on the links in the table headers for details on position and time

| Energy (MeV) | Segment 1 |
|--------------|---------------------------|
| 0.10 | 3.7620E+03 |
| 0.15 | 3.7520E+03 |
| 0.20 | 3.7420E+03 |
| 0.30 | 3.7331E+03 |
| 0.40 | 3.7243E+03 |
| 0.50 | 3.7123E+03 |
| 0.60 | 3.7004E+03 |
| 0.70 | 3.6952E+03 |
| 1.00 | 3.6701E+03 |
| 1.50 | 3.6504E+03 |
| 2.00 | 3.6307E+03 |
| 3.00 | 3.5938E+03 |
| 4.00 | 3.5572E+03 |
| 5.00 | 3.5351E+03 |
| 6.00 | 3.5131E+03 |
| 7.00 | 3.4562E+03 |
| 10.00 | 3.2987E+03 |
| 15.00 | 3.2331E+03 |
| 20.00 | 3.0320E+03 |
| 30.00 | 2.9337E+03 |
| 40.00 | 2.6373E+03 |
| 50.00 | 2.3709E+03 |
| 60.00 | 2.1267E+03 |
| 70.00 | 1.9055E+03 |
| 100.00 | 1.3483E+03 |
| | |

| | |
|--------|------------|
| 150.00 | 7.8039E+02 |
| 200.00 | 4.8413E+02 |
| 300.00 | 1.7549E+02 |
| 400.00 | 6.3700E+01 |

**Integral peak
electron
flux (/cm²/s); click
on the links in the
table headers for
details on position
and time**

| Energy (MeV) | Segment 1 |
|-------------------------|----------------------------------|
| 0.04 | 3.6478E+06 |
| 0.10 | 2.4119E+06 |
| 0.20 | 7.9320E+05 |
| 0.30 | 3.3465E+05 |
| 0.40 | 1.8114E+05 |
| 0.50 | 9.8043E+04 |
| 0.60 | 6.8728E+04 |
| 0.70 | 4.8177E+04 |
| 0.80 | 3.5734E+04 |
| 1.00 | 2.2009E+04 |
| 1.25 | 1.3928E+04 |
| 1.50 | 8.8145E+03 |
| 1.75 | 5.9005E+03 |
| 2.00 | 3.9499E+03 |
| 2.25 | 2.7413E+03 |
| 2.50 | 1.9025E+03 |
| 2.75 | 7.3877E+02 |
| 3.00 | 2.8687E+02 |
| 3.25 | 8.2359E+01 |
| 3.50 | 2.3645E+01 |
| 3.75 | 6.8187E+00 |
| 4.00 | 1.9664E+00 |

| | |
|------|------------|
| 4.25 | 0.0000E+00 |
| 4.50 | 0.0000E+00 |
| 4.75 | 0.0000E+00 |
| 5.00 | 0.0000E+00 |
| 5.50 | 0.0000E+00 |
| 6.00 | 0.0000E+00 |
| 6.50 | 0.0000E+00 |
| 7.00 | 0.0000E+00 |