## Muons in Kolar Gold Fields rock, std rock density

| $\langle Z/A \rangle$ | $\rho$ [g/cm$^3$] | $I$ [eV] | $a$ | $k = m_s$ | $x_0$ | $x_1$ | $\overline{C}$ | $\delta_0$ |
|---|---|---|---|---|---|---|---|---|
| 0.48605 | 2.650 | 183.4 | 0.16068 | 3.0000 | 0.2284 | 3.0284 | 4.5791 | 0.00 |

| $T$ | $p$ [MeV/$c$] | Ionization | Brems | Pair prod | Photonucl | Total | CSDA range [g/cm$^2$] |
|---|---|---|---|---|---|---|---|
| | | [MeV cm$^2$/g] | | | | | |
| 10.0 MeV | $4.704 \times 10^1$ | 6.167 | | | | 6.168 | $9.047 \times 10^{-1}$ |
| 14.0 MeV | $5.616 \times 10^1$ | 4.834 | | | | 4.834 | $1.645 \times 10^0$ |
| 20.0 MeV | $6.802 \times 10^1$ | 3.793 | | | | 3.793 | $3.062 \times 10^0$ |
| 30.0 MeV | $8.509 \times 10^1$ | 2.957 | | | | 2.957 | $6.089 \times 10^0$ |
| 40.0 MeV | $1.003 \times 10^2$ | 2.533 | | | | 2.533 | $9.766 \times 10^0$ |
| 80.0 MeV | $1.527 \times 10^2$ | 1.916 | | | | 1.916 | $2.849 \times 10^1$ |
| 100. MeV | $1.764 \times 10^2$ | 1.806 | | | | 1.806 | $3.927 \times 10^1$ |
| 140. MeV | $2.218 \times 10^2$ | 1.692 | | | | 1.692 | $6.225 \times 10^1$ |
| 200. MeV | $2.868 \times 10^2$ | 1.631 | | | | 1.631 | $9.851 \times 10^1$ |
| 280. MeV | $3.708 \times 10^2$ | 1.614 | | | 0.000 | 1.615 | *Minimum ionization* |
| 300. MeV | $3.917 \times 10^2$ | 1.615 | | | 0.000 | 1.615 | $1.603 \times 10^2$ |
| 400. MeV | $4.945 \times 10^2$ | 1.629 | | | 0.000 | 1.629 | $2.220 \times 10^2$ |
| 800. MeV | $8.995 \times 10^2$ | 1.711 | 0.000 | | 0.000 | 1.712 | $4.615 \times 10^2$ |
| 1.00 GeV | $1.101 \times 10^3$ | 1.746 | 0.000 | | 0.000 | 1.747 | $5.771 \times 10^2$ |
| 1.40 GeV | $1.502 \times 10^3$ | 1.801 | 0.001 | 0.000 | 0.001 | 1.803 | $8.023 \times 10^2$ |
| 2.00 GeV | $2.103 \times 10^3$ | 1.862 | 0.001 | 0.000 | 0.001 | 1.865 | $1.129 \times 10^3$ |
| 3.00 GeV | $3.104 \times 10^3$ | 1.931 | 0.002 | 0.001 | 0.001 | 1.935 | $1.655 \times 10^3$ |
| 4.00 GeV | $4.104 \times 10^3$ | 1.979 | 0.002 | 0.002 | 0.002 | 1.985 | $2.165 \times 10^3$ |
| 8.00 GeV | $8.105 \times 10^3$ | 2.087 | 0.006 | 0.006 | 0.004 | 2.102 | $4.116 \times 10^3$ |
| 10.0 GeV | $1.011 \times 10^4$ | 2.119 | 0.008 | 0.008 | 0.005 | 2.139 | $5.059 \times 10^3$ |
| 14.0 GeV | $1.411 \times 10^4$ | 2.166 | 0.011 | 0.013 | 0.006 | 2.196 | $6.903 \times 10^3$ |
| 20.0 GeV | $2.011 \times 10^4$ | 2.212 | 0.018 | 0.021 | 0.009 | 2.259 | $9.595 \times 10^3$ |
| 30.0 GeV | $3.011 \times 10^4$ | 2.261 | 0.029 | 0.036 | 0.013 | 2.339 | $1.394 \times 10^4$ |
| 40.0 GeV | $4.011 \times 10^4$ | 2.294 | 0.041 | 0.053 | 0.017 | 2.405 | $1.816 \times 10^4$ |
| 80.0 GeV | $8.011 \times 10^4$ | 2.369 | 0.093 | 0.126 | 0.033 | 2.621 | $3.406 \times 10^4$ |
| 100. GeV | $1.001 \times 10^5$ | 2.391 | 0.121 | 0.166 | 0.041 | 2.720 | $4.155 \times 10^4$ |
| 140. GeV | $1.401 \times 10^5$ | 2.425 | 0.178 | 0.249 | 0.056 | 2.909 | $5.576 \times 10^4$ |
| 200. GeV | $2.001 \times 10^5$ | 2.461 | 0.267 | 0.379 | 0.080 | 3.188 | $7.546 \times 10^4$ |
| 300. GeV | $3.001 \times 10^5$ | 2.501 | 0.421 | 0.601 | 0.120 | 3.643 | $1.048 \times 10^5$ |
| 400. GeV | $4.001 \times 10^5$ | 2.530 | 0.579 | 0.831 | 0.160 | 4.101 | $1.306 \times 10^5$ |
| 628. GeV | $6.283 \times 10^5$ | 2.575 | 0.952 | 1.371 | 0.252 | 5.151 | *Muon critical energy* |
| 800. GeV | $8.001 \times 10^5$ | 2.600 | 1.238 | 1.785 | 0.323 | 5.946 | $2.112 \times 10^5$ |
| 1.00 TeV | $1.000 \times 10^6$ | 2.622 | 1.577 | 2.276 | 0.406 | 6.883 | $2.424 \times 10^5$ |
| 1.40 TeV | $1.400 \times 10^6$ | 2.657 | 2.260 | 3.253 | 0.576 | 8.746 | $2.939 \times 10^5$ |
| 2.00 TeV | $2.000 \times 10^6$ | 2.694 | 3.306 | 4.748 | 0.834 | 11.582 | $3.533 \times 10^5$ |
| 3.00 TeV | $3.000 \times 10^6$ | 2.736 | 5.057 | 7.233 | 1.277 | 16.304 | $4.258 \times 10^5$ |
| 4.00 TeV | $4.000 \times 10^6$ | 2.767 | 6.836 | 9.750 | 1.727 | 21.080 | $4.796 \times 10^5$ |
| 8.00 TeV | $8.000 \times 10^6$ | 2.842 | 14.024 | 19.878 | 3.599 | 40.343 | $6.144 \times 10^5$ |
| 10.0 TeV | $1.000 \times 10^7$ | 2.867 | 17.653 | 24.974 | 4.562 | 50.057 | $6.588 \times 10^5$ |
| 14.0 TeV | $1.400 \times 10^7$ | 2.905 | 24.900 | 35.134 | 6.544 | 69.484 | $7.264 \times 10^5$ |
| 20.0 TeV | $2.000 \times 10^7$ | 2.946 | 35.852 | 50.449 | 9.587 | 98.834 | $7.984 \times 10^5$ |
| 30.0 TeV | $3.000 \times 10^7$ | 2.993 | 54.064 | 75.941 | 14.860 | 147.859 | $8.806 \times 10^5$ |
| 40.0 TeV | $4.000 \times 10^7$ | 3.027 | 72.355 | 101.509 | 20.267 | 197.158 | $9.390 \times 10^5$ |
| 80.0 TeV | $8.000 \times 10^7$ | 3.111 | 145.699 | 203.858 | 42.914 | 395.583 | $1.079 \times 10^6$ |
| 100. TeV | $1.000 \times 10^8$ | 3.138 | 182.463 | 255.089 | 54.637 | 495.327 | $1.124 \times 10^6$ |