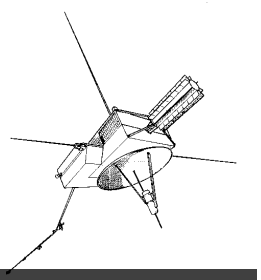
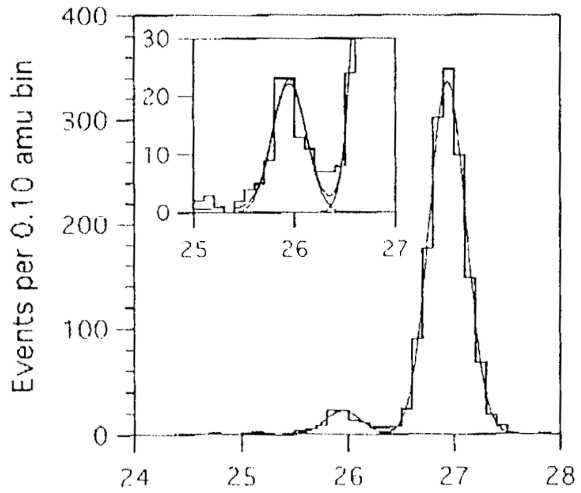
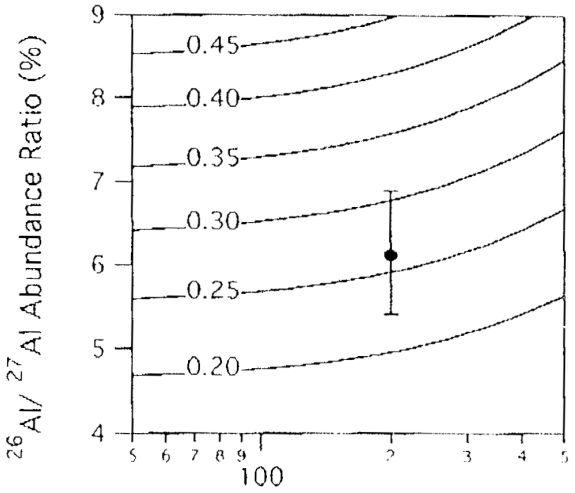
New Measurement of ^{26}Al from the ULYSSES COSPIN High Energy Telescope







COSPIN High Energy Telescope team recently reported the first clearly resolved measurement of ^{26}Al in galactic cosmic rays (Simpson, Connel, Ap. J. Lett. in press). The separation of Aluminum isotopes is shown in the left plot with the inset showing the expanded ^{26}Al peak. ^{26}Al is a long-lived ($\tau_{1/2}$ ~9 X 10^5 years) unstable (radioactive) isotope. It is produced by heavier cosmic rays fragmenting as they travel through the material of the interstellar medium. The abundance of ^{26}Al reflects the competition between decay and production that depends upon the density of material the cosmic rays traverse. The curves in the right hand plot show the calculated abundance ratios for ^{26}Al/^{27}Al for various densities of the interstellar medium (marked in atom/cm^3). The data point is the measured HET value. From this we deduce an average density of $0.26^{+0.05}_{-0.04}$ atoms/cm^3 corresponding to a “leaky-box” age of 19±3 million years. Since this density is substantially less than the average of ~1 atom/cm^3 found in the galactic disk, it is likely that cosmic rays spend much of their time in an extended galactic halo.

Submitted by Bruce McKibben