



SuperTIGER Ultra-Heavy Galactic Cosmic Ray Atmospheric Propagation Corrections and Uncertainty Analysis



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- SuperTIGER (Super Trans-Iron Galactic Element Recorder) balloon-borne ultra-heavy galactic cosmic-ray (UHGCR) detector has flown twice in the stratosphere over Antarctica at altitudes up to ~130,000 ft.
- Atmospheric propagation corrections based on those for preceding TIGER.
- Top of the atmosphere (TOA) elemental abundances found by iteratively solving networks of equations for all elements with partial and total charge changing cross sections stepping through fine slabs of material.
- TOA abundances corrected for nuclear interactions for each element are scaled with the fraction of the integral energy spectrum for its TOA minimum energy, using the ^{26}Fe spectrum for the UHGCR.
- Statistical uncertainties are derived at the TOA by shifting the abundance of each element individually up and down by the measured uncertainty in the instrument and calculating the TOA abundance of that element.
- Systematic uncertainties estimated by simultaneously shifting the partial and then the total cross sections for all elements up and down by their uncertainties and finding TOA abundances compared to the nominal values.

