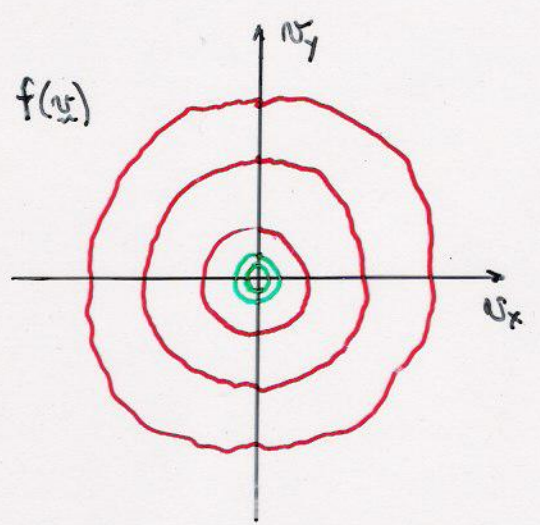
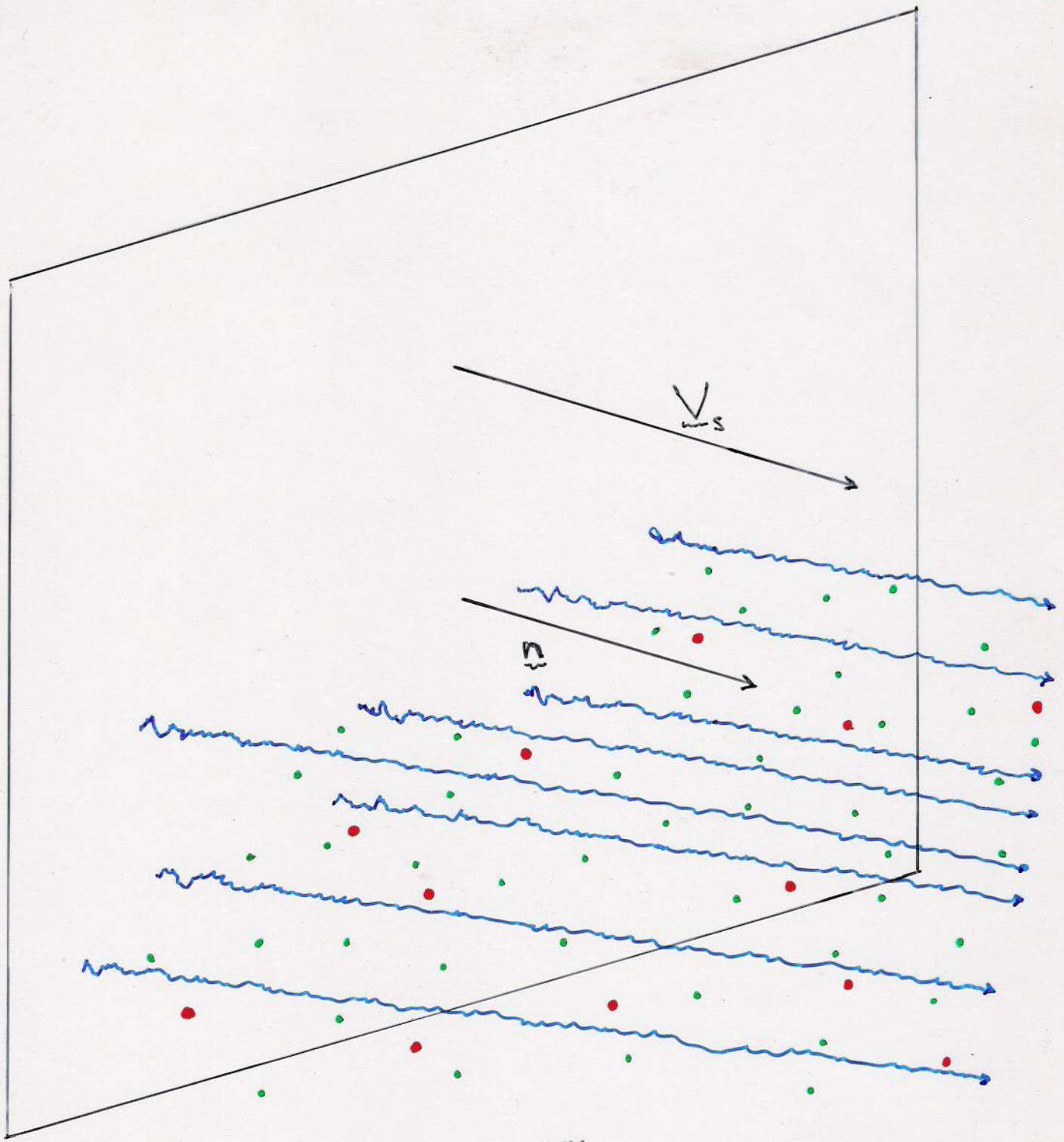
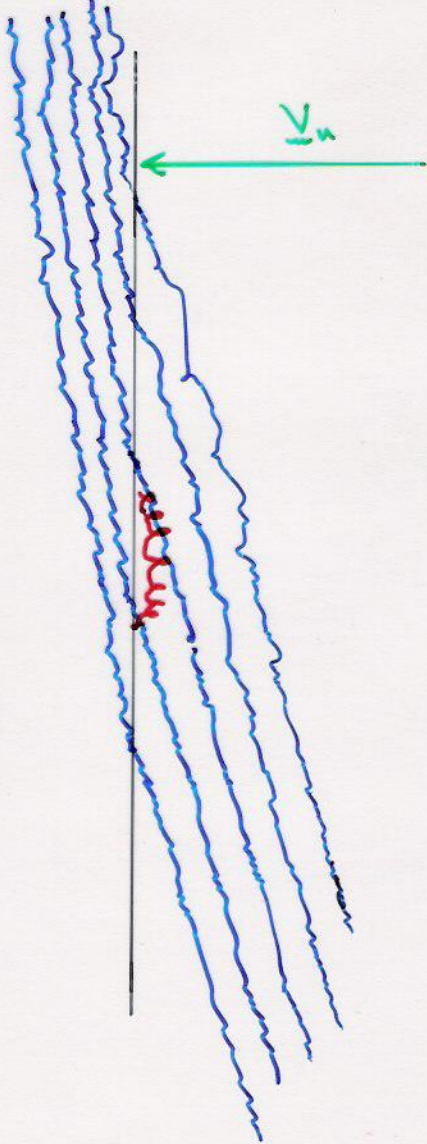
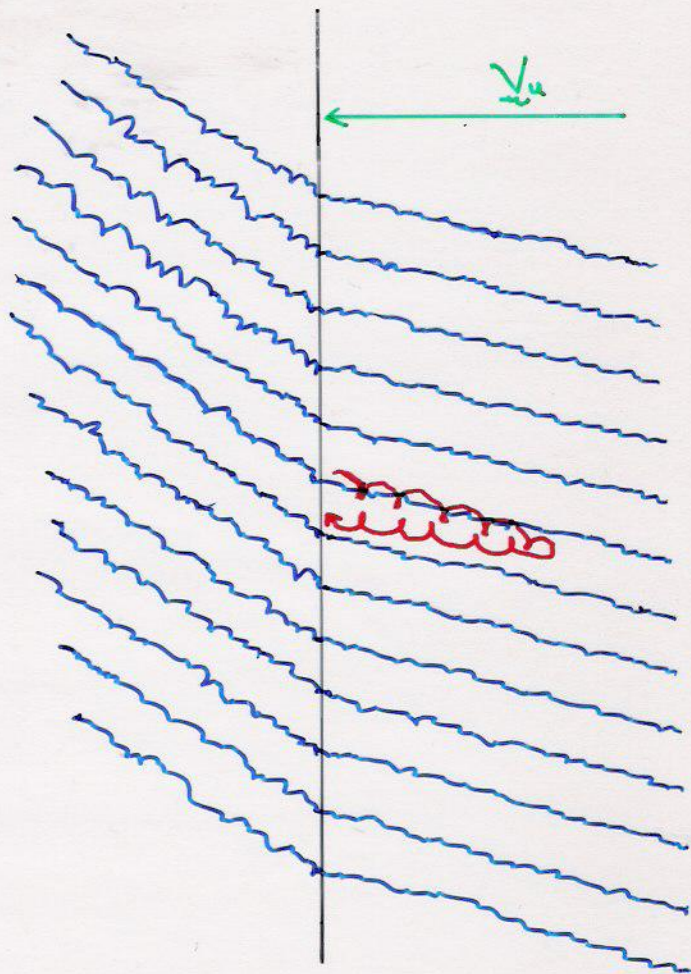


Figure 2





Q1



QII

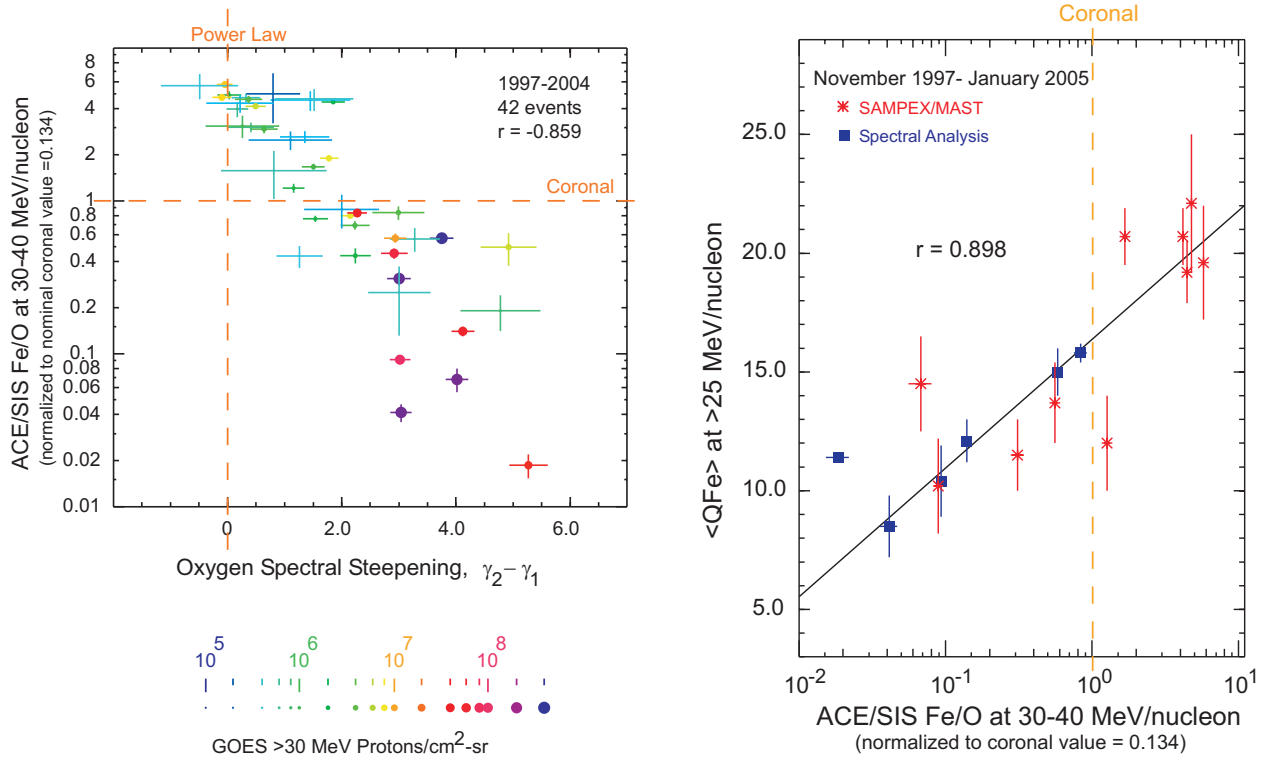


Fig. 3.— Two aspects of correlated variability among high-energy SEPs. Figure 3a (left panel) shows the correlation of event-integrated Fe/O at 30-40 MeV/nucleon vs. spectral steepening of the oxygen spectrum in the largest SEP events of 1997-2004, as described in the text. The weighted correlation coefficient for this plot is $r = -0.859$ for 42 events. The Fe-rich events tend to be more like power-laws. The symbol size and color indicate the event-integrated fluence of >30 MeV protons, as given in the legend at the bottom [from Tylka et al. 2005]. Figure 3b (right panel) shows measurements of the mean ionic charge of iron ($\langle Q_{Fe} \rangle$) from *SAMPEX* (red asterisks) at $\gtrsim 25$ MeV/nucleon [Leske et al. 2001; Labrador et al. 2003, 2005] and from spectral analyses [Tylka et al. 2000, 2001, 2006] at comparable energies (blue filled squares) plotted versus *ACE/SIS* Fe/O at 30-40 MeV/nucleon. Two events have been measured by both methods, which agree to within uncertainties. In order to avoid double counting, the correlation fit omitted the spectral analyses from these two events. The correlation fit also omitted the outlying datapoint on the far left. The weighted correlation coefficient in this panel is $r = 0.898$ for 13 events.

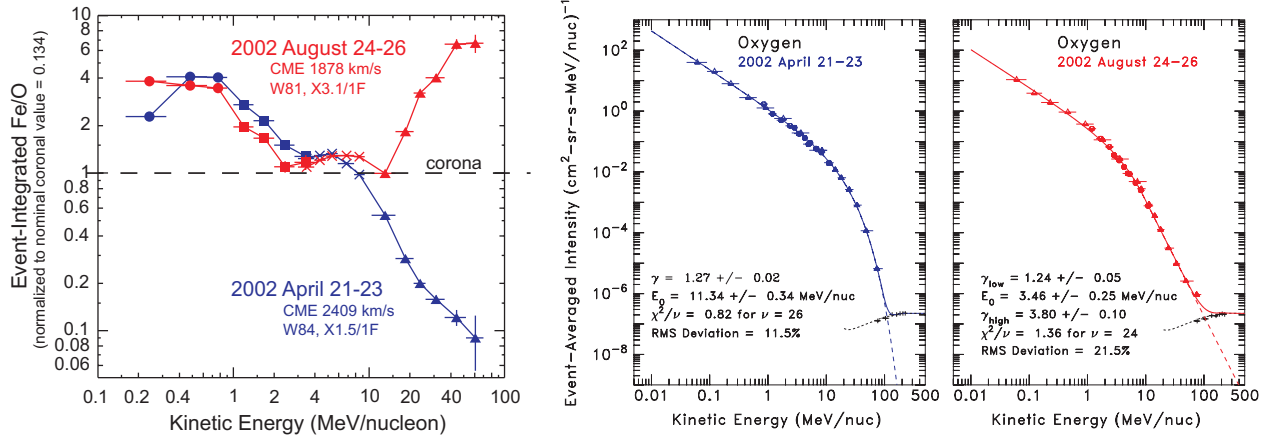


Fig. 4.— Left panel: event-integrated Fe/O (normalized to the nominal coronal value 0.134 [Reames 1995b]) versus energy for the solar energetic particle events of 2002 April 21 (blue) and 2002 August 24 (red). In order of increasing energy, the data come from the Ultra Low-Energy Isotope Spectrometer [ULEIS; Mason et al. 1998; circles] on the Advanced Composition Explorer (*ACE*), the Electron Proton, and Alpha Monitor [EPAM; Gold et al. 1999; squares] on *ACE*, LEMT [von Roseninge et al. 1995; crosses] on *Wind*, and the Solar Isotope Spectrometer [SIS; Stone et al. 1998; triangles] on *ACE*. Right panel: event-averaged oxygen spectra in these two events. The curves through the datapoints are fits to the Ellison & Ramaty [1985] functional form (for the April event) and the double power-law Band et al. [1993] functional form (for the August event). Fit parameters, reduced χ^2 , and rms deviation from the fit are noted in each panel. The small crosses in the lower right corners are contemporaneous Galactic cosmic ray (GCR) measurements from *ACE*. Short dashes show estimated GCRs, long dashes are the extrapolated SEP fits, and solid curves show the sum of fitted SEPs and GCRs. Details about the data selection, fit procedures, and systematic uncertainties are given in Tylka et al. [2006].