FAST

Mass Spectrometer (TEAMS)

Known Data Problems and Limitations

Mismatch Between PAC Voltage and Lookup Table

Cause: PAC discharge, change in nominal PAC voltage, or DPU reset
APID's Affected: All
Period Affected: See the Lockheed TEAMS site http://teams.spasci.com for a list of affected intervals
Comments: Do not use data from these periods

Self-Stimulation

Cause: A test mode occasionally requested by the experimenters
APID's Affected: All
Comments: Creates an artificial signal at a commandable pixel and time of flight. Should be obvious as the signal overwhelms any naturally occurring signals. Do not use data from these periods

Changes in Nominal MCP Voltage

Cause: Request by experimenters
APID's Affected: All TEAMS science data
Period Affected: See the Lockheed TEAMS site http://teams.spasci.com for a list of affected intervals
Comments: Do not compare data across an MCP voltage change. Do not use data from 16-26 June 1998 (orbits 7188-7296), as the MCP voltage was changed several times during this period in order to conduct an instrumental experiment.

H+ Counts Contaminate He++ Channel

Cause: Inherent width of H+ TOF peak
APID's Affected: 1027, 1029, 1047
Period Affected: Entire mission

Comments: Use HiMass data to check degree of contamination; if no separate He++ peak, do not use He++ data. A similar problem affected He+ data from the Freja mass spectrometer

Elevated Noise Floor at All Times of Flight

Cause: Accidental coincidences at high counting rates
APID's Affected: All
Period Affected: Cusp and radiation belt crossings; periods affected by ram or spacecraft charging
Workaround: Some routines allow background subtraction (check the IDL documentation for details)

Counts Displaced into Wrong Solid Angle Bin

Cause: Timing error in accumulator board logic
APID's affected: 1027
Period Affected: Intermittently from spring 1997 onward
Workaround: A technique described in K. Seki et al., J. Geophys. Res. 105, 15931, 2000, allows recovery of the initial distribution by assuming the angular distribution is identical to that of the IESA

Peaks at 6 and 9 AMU/q ("C++ " and "Be+ ")

Cause: Resonance frequencies in TEAMS electronics
APID's Affected: 1028
Period Affected: Intermittent periods during entire mission

Long TOF Tail for O+

Cause: Energy loss when passing through carbon foil
APID's Affected: 1028
Period Affected: Entire mission
Comments: This limitation has prevented the detection of molecular ions

Efficiency Drifts

Cause: Aging of MCP's; for anodes nearest spin plane, ram accelerated the aging process. Temperature variations also contribute
APID's Affected: All TEAMS science data
Period Affected: Starting winter 1997 and progressively worsening
Comments: A fix is in progress and will be released as soon as we have completed testing

Intermittent Dropouts of High-Energy Counts

Cause: Not determined; believed to be timing error in DPU logic
APID's Affected: 1027
Period Affected: Northern hemisphere passes from December 1996 onward
Comments: Believed to be interference from certain fields modes, aggravated during contacts

Ram

Cause: Spacecraft velocity with respect to background plasma
APID's Affected: 1027, 1028, 1030, 1031, 1047
Period Affected: Traversals of any region with significant cold (< 10eV) O+
Comment: Primarily affects O+ , since the kinetic energy of O+ at 7 km/s (a typical spacecraft speed) is about 8 eV. Can skew moments calculations since these codes assume that the spacecraft velocity is negligible compared to particle velocities

Spacecraft Charging

Cause: Photoelectron emission and/or problems with E-field sphere bias
APID's Affected: All
Period Affected: Intermittently during fall 1996; all traversals of density cavity when spacecraft is in darkness; all data from fall 2000 onward
Comments: Obvious in the low energy ion spectra. Current moment calculations do not account for the spacecraft potential

Incorrect Magnetic Field Phase in the Header

Cause: Data collected while magnetometer is off
APID's Affected: 1027, 1028
Period Affected: Low-latitude (equator-ward of 60 degrees invariant) data from about June 2000 onward
Comments: Primarily affects calculations involving pitch angle. Should be fixable in the same way as for the ESA data.