

Proposed MMS Level 3 Data Products

Product (Instruments)	Rationale	Comments
Electron density (FPI, FEEPS, ASPOC, E and B Fields)	Fundamental for accurate currents	L2 for FPI, using ASPOC s/c potential. Reconciliation with Fp/uh needs detailed analysis
Ion number/mass density (FPI, HPCA, EIS, ASPOC)	Fundamental to Alfvén speed and more	L2 for FPI, using ASPOC Vs/c. HPCA for composition
Electric current density (FPI, HPCA, Fields)	Basis for Maxwell stress	Differences challenge
Zero energy drift speed (E Field and B Field)	Basic particle drift motion ($\mathbf{E} \times \mathbf{B}$)	EDI gives DC cross calibration
Slippage speed $\mathbf{V}_i - \mathbf{V}_e$ (FPI, HPCA)	Signature of energy dissipation	Differences challenge
e- slippage speed $\mathbf{V}_e - \mathbf{V}_{(E \times B)}$ (FPI, E and B Field)	Or $\mathbf{E}' = \mathbf{E} + \mathbf{V}_e \times \mathbf{B}$ to isolate dissipation from conversion	Differences challenge
Alfvén Speed (FPI, HPCA, B Field)	Fundamental to rate measurement	
Plasma beta (FPI, HPCA, EPD, B Field)	Important regulator	L2 for FPI using IBI
Electron pressure tensor (FPI, FEEPS)	Fundamental driving force and dissipation	L2 for FPI
Ion pressure tensor (FPI, HPCA, EIS)	Fundamental driving force and dissipation	L2 for FPI; composition for L3
Energetic Ion agyrotropy (EIS, B Field)	Gradient remote sensing	
Energetic electron anisotropy (FEEPS, FPI, B Field)	Field topology remote sensing	

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Notes:

1. L3 products are defined to be based on L2 products from more than one instrument.
2. Multiple s/c combinations from single instruments (**E**, **B**, n, **V**, T, etc.) are considered derivable from L2 data.
3. FPI, HPCA, EPD use of **V**s/c and **B** are considered to create L2 rather than L3 products.
4. L3 products that depend on EPD or HPCA results are necessarily limited to fast survey data, i.e. 10 sec (half spacecraft spin period) time averages.
5. Suggestion has been made that L3 products be defined as “key parameters” rather than as “science grade” with appropriate provisos stating that detailed analysis is required to fully validate them in all cases.
6. Others?