MMS in pySPEDAS Updates

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MMS in pySPEDAS Updates

- Presented to the MMS science team in Feb 2019
- Held a webinar on MMS in pySPEDAS in March 2019; 50+ attendees
- Presented to the MMS/FPI team in March 2019
- Many updates, bug reports and fixes since those presentations

MMS in pySPEDAS Updates

- Access to team-only data (QL, L1, L2pre), as well as L2 data
- Access to support data via the get_support_data keyword
- Access to available data files (without downloading) with the available keyword
- Data can be loaded from disk without internet connectivity
- Data files are stored in temporary directories until each download completes, to avoid partial downloads of files due to internet connectivity issues
- Local data directory can be specified by the MMS_DATA_DIR environment variable, or by the 'local_data_dir' value in mms_config.py
- Local data paths match those at the SDC, as well as those used by IDL SPEDAS
- Data can be clipped to the requested time range after loading via the time_clip keyword
- FGM data are automatically deflagged
- EIS omni-directional spectrograms are calculated from the individual telescope data by default
- FPI and HPCA measurements can be adjusted to the center of the accumulation interval with the center_measurement keyword
- Keywords for specifying instrument details (level, data_rate, datatype) accept strings as well as arrays of strings
- The probe keyword accepts strings, arrays of strings, ints and arrays of ints
- The load routines accept a wide range of time range formats via the trange keyword
- The load routines correctly handle access to all burst-mode data, even when small time ranges are requested

MMS in pySPEDAS Updates

- Most common question that I've gotten so far:

"What about the particles? (slices/spectrograms/etc)"

HDEE Call

- We're proposing to develop analysis tools for in-situ particle data from various missions (starting with THEMIS and ARASE)
  - Mission specific code will be the responsibility of (and funded by) the mission teams
  - HDEE funds would support developing the initial specification and core, mission/instrument independent code to do Heliophysics particle calculations, including:
    - Calculate energy, phi, theta flux and energy-flux spectrograms from plasma distribution functions
    - Calculate moments from plasma distribution functions
    - Perform transformations of plasma distribution functions to various field aligned coordinate systems
    - Generate pitch angle distributions and gyrophase spectrograms from distribution functions in field aligned coordinates