

Workshop wrap-up

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- Objectives of the meeting
- Presentation of cosmic visions
- Observations
- Analysis and modelling applications

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Objectives of the meeting

- Review existing and foreseen problems related to electrostatic cleanliness of scientific mission.
- Review state of the art in analysis methods, modelling and prediction.
- Provide inputs on modelling requirements.

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Presentation of cosmic vision

- CROSS-SCALE, EJSM/JGO+JEO and Tandem will have plasma diagnostic package.
- CROSS-SCALE will have ion emitters.
- Tandem will have electric propulsion but only during cruise

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Observations

- Effects of contamination, surface charging, space charge, wakes.
- Some effects provide scientific information.
- Some critical elements:
 - Photo-electron contamination on ES spectrometer and LP.
 - wire boom effects.
 - Spectra of secondaries (including photo-electron).
 - UV-X effects.
 - Champ potential behaviour (i.e., very low altitude orbit)

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Applications

- Several tools applied:
 - Femlab
 - SPIS
 - PicUp3D
 - In house developments
- Critical elements
 - Modelling of wire boom effects.
 - Modelling of solar arrays (interconnectors – glasses)
 - Spectra of secondaries (including photo-electron).
 - Need of UV-X model, work functions, etc...
 - Beam models
 - Validation by observations
 - Validation of time dependent models
 - B field
 - CIV?
 - Neutrals?

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Inputs to software development requirements: needs

- Physics:
 - Wire boom interaction with plasma (incl. secondary emission and particle collection).
 - Modelling of solar arrays (interconnectors – glasses)
 - Spectra of secondaries (including photo-electron).
 - Need of UV-X model, work functions, etc...
 - Beam models
 - Interaction with neutrals (CIV, collisions, etc...).
 - B field.
 - Wakes
 - Model of ground based testing environment
 - Model of ambient environment
 - Neutral gas dynamics?
 - Deep (dielectric) charging?
 - Dust?
 - Accuracy requirements.

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Inputs to software development requirements: needs

- Project environment:
 - Validation by observations
 - Validation of time dependent models
 - Full scientific documentation (physics, algorithm, reproducible test description and results, intrinsic accuracy, accuracy estimate techniques)
 - Guidelines for community based development.
 - Modularity – as much as possible with stand alone elements.
 - Deciding committee (SPINE SDAB)

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Inputs to software development requirements: needs

- Software/algorithm:
 - Restart
 - Standard tests
 - fluid/kinetic interface
 - Fluid, bi-fluid?
 - Hybrid?
 - Particle splitting and coalescence
 - Immersed boundary method?
 - Photon-material and neutral interactions.
 - Other?

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