2004/12/06

SPIS 3.01.0

Spacecraft Plasma Interaction system

SPIS-UI new features

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Objectives of the period June-November 2004

- Interaction with the community
  - Support
  - Feedbacks
- Improvement of the stability and reliability
- Improvement of the global performances
- Improvement of export and saving possibilities
- Introduction of thin elements (1D, 2D)
  - CAD and meshing definition
  - Groups settings
- Testing and validation
- Migration of the SPINE Web site
- Hosting on the new ***LibreSource*** server

Interaction with the community

- Critics and feedbacks
  - Instability of the framework
  - Too slow
  - Too costly in memory
  - UI not always very logical and easy to use
  - Weaknesses and bugs in the post-processing modules (visualisation grid generation)
  - Lack of saving and export possibilities
- Help and support
- Contributions ?

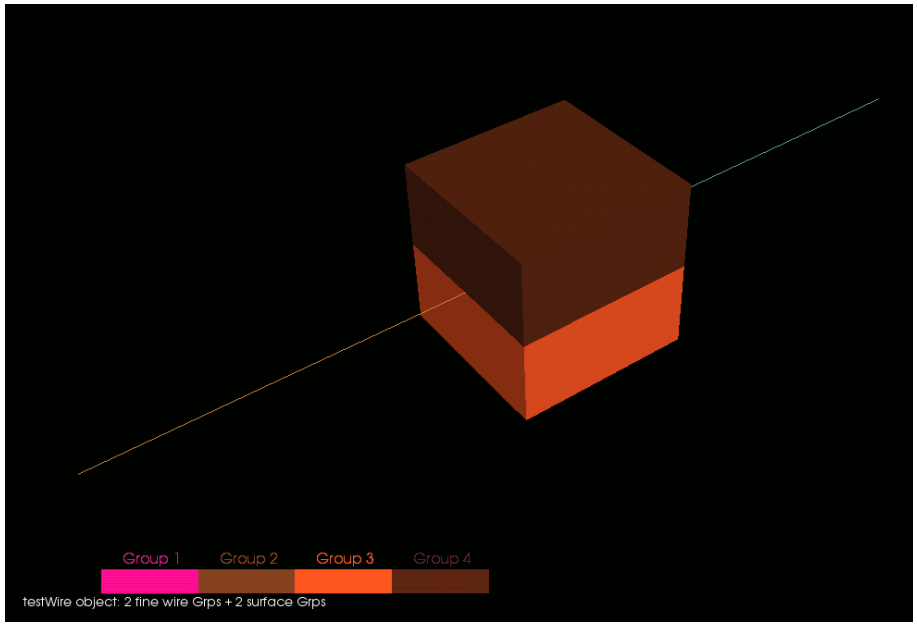
Stability and performances

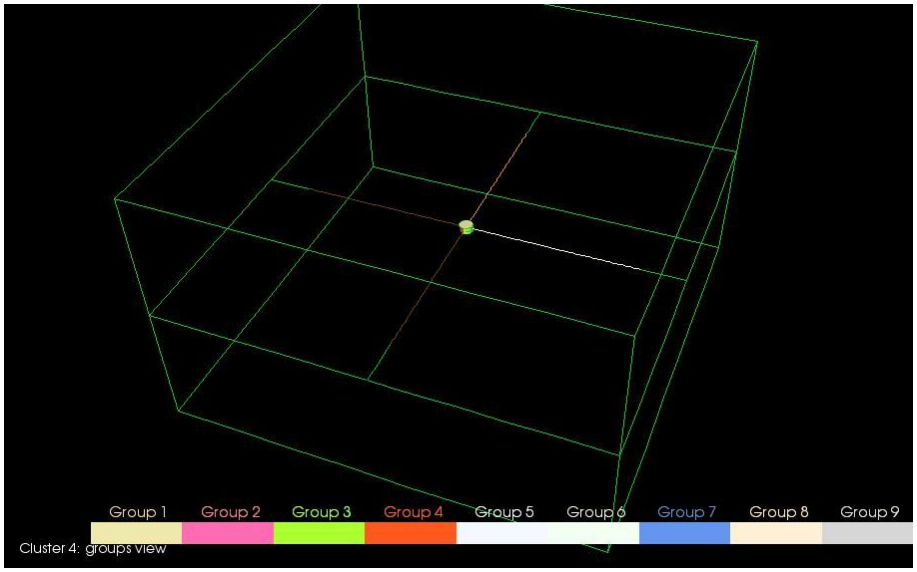
- Progressive improvement of systems related (IO, exec, etc...) methods (main source of trouble)
- Better configuration of the TaskManager; preprocessing can be reduced to only three buttons.
- Progressive introduction of interruptions controls with more explicit error messages
- Mesh modules translated and re-factored in Java to reduce the memory cost (not integrated in the framework yet)

Thin elements

Wires (1D)

- ✔ Meshing possible with Gmsh
- ✔ Groups setting
- ✔ Interface with SPIS-NUM
  - **-> Integrated**
  - **-> Operational**





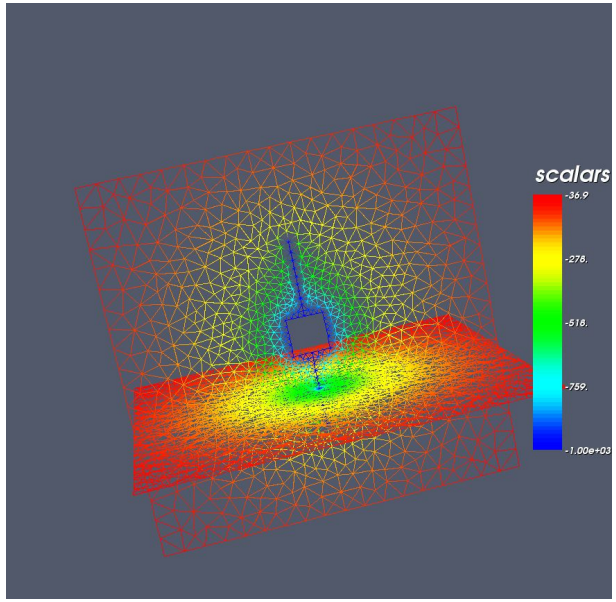


Image ONERA

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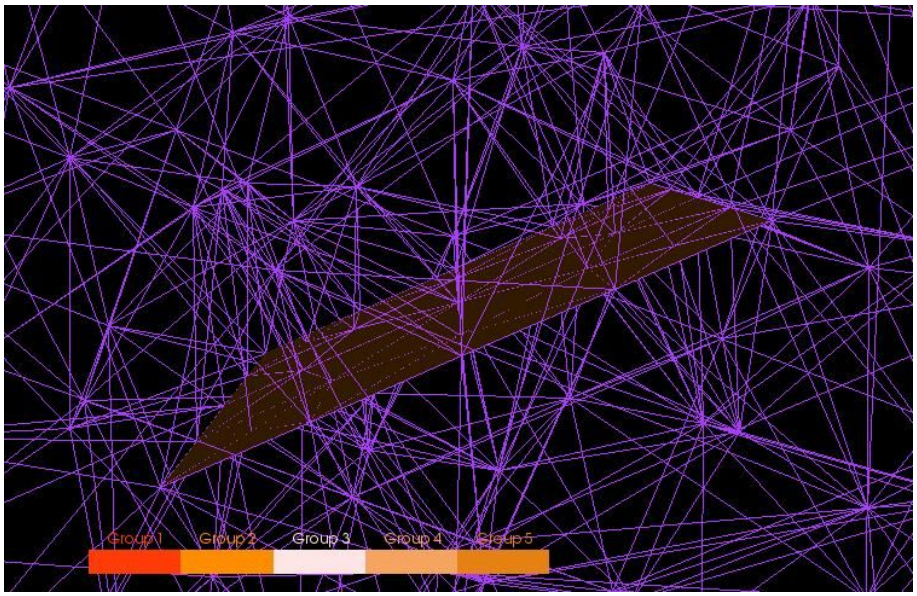
Thin elements

Surfaces (2D)

- Possibility of 3D meshing around thin surfaces with Gmsh
- Groups settings procedures adapted
- But... necessity of duplication of elements on the surface



Development of a specific module of mesh splitting

Still under validation and not fully integrated.

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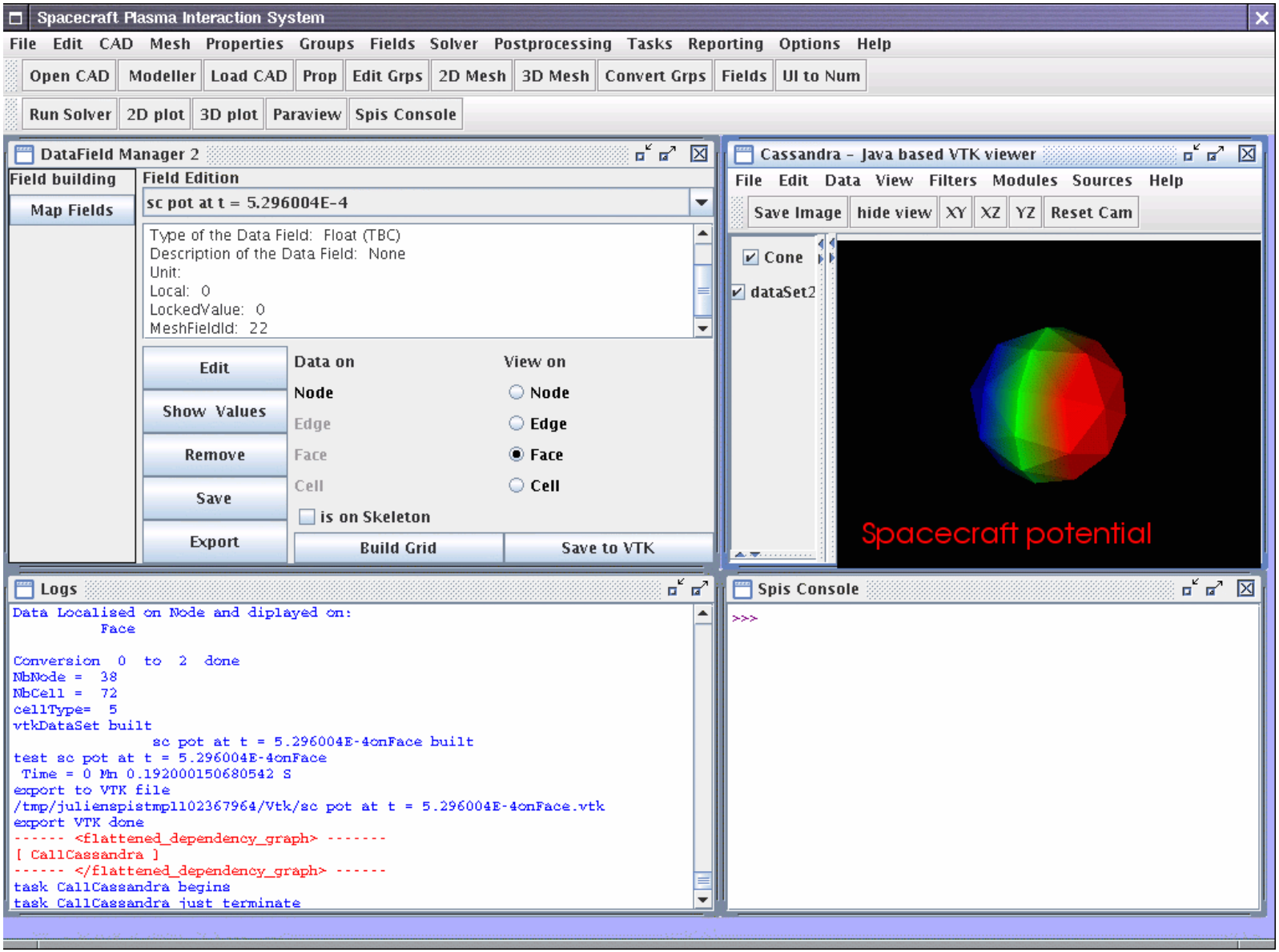
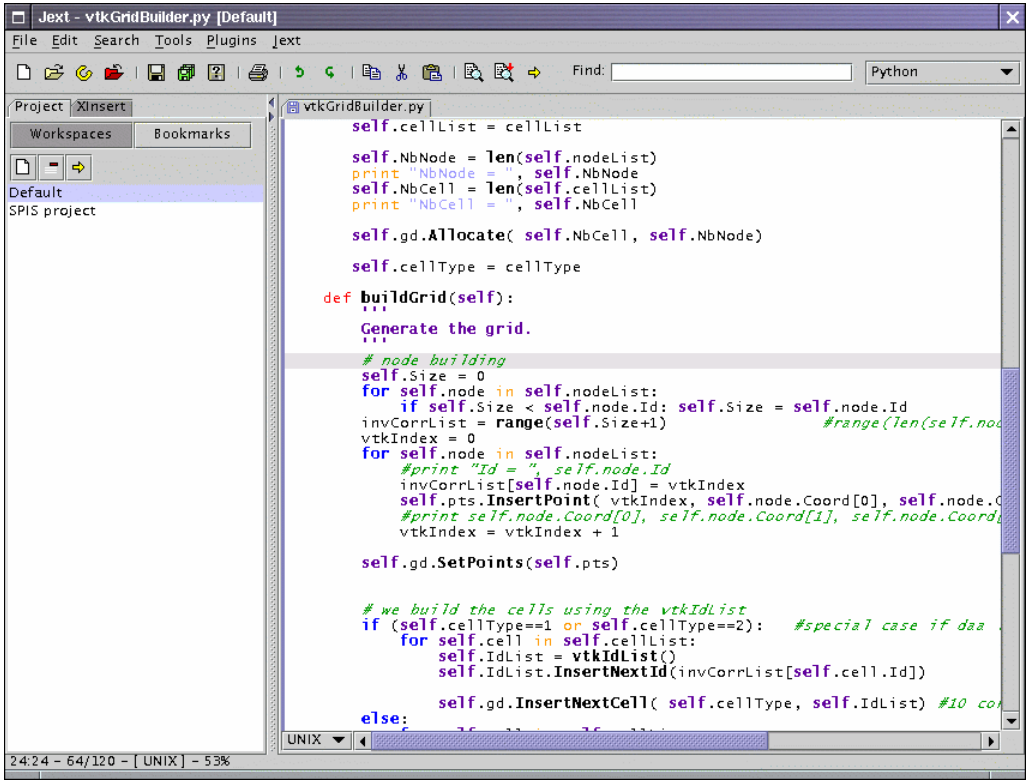

Spacecraft Plasma Interaction System
File Edit CAD Mesh Properties Groups Fields Solver Postprocessing Tasks Reporting Options Help
Open CAD Modeller Load CAD Prop Edit Grps 2D Mesh 3D Mesh Convert Grps Fields UI to Num
Run Solver 2D plot 3D plot Paraview Spis Console
DataField Manager 2
Field building
Map Fields
Field Edition
sc pot at t = 5.296004E-4
Type of the Data Field: Float (TBC)
Description of the Data Field: None
Unit:
Local: 0
LockedValue: 0
MeshFieldId: 22
Edit
Show Values
Remove
Save
Export
Data on
Node
Edge
Face
Cell
is on Skeleton
View on
Node
Edge
Face
Cell
Build Grid
Save to VTK
Cassandra - Java based VTK viewer
File Edit Data View Filters Modules Sources Help
Save Image hide view XY XZ YZ Reset Cam
Cone
dataSet2
Spacecraft potential
Logs
Data Localised on Node and diplayed on:
Face
Conversion 0 to 2 done
NbNode = 38
NbCell = 72
cellType= 5
vtkDataSet built
sc pot at t = 5.296004E-4onFace built
test sc pot at t = 5.296004E-4onFace
Time = 0 Mn 0.192000150680542 S
export to VTK file
/tmp/julienspistmpl102367964/Vtk/sc pot at t = 5.296004E-4onFace.vtk
export VTK done
------ <flattened_dependency_graph> -------
[CallCassandra]
------ </flattened_dependency_graph> ------
task CallCassandra begins
task CallCassandra just terminate
Spis Console
>>>

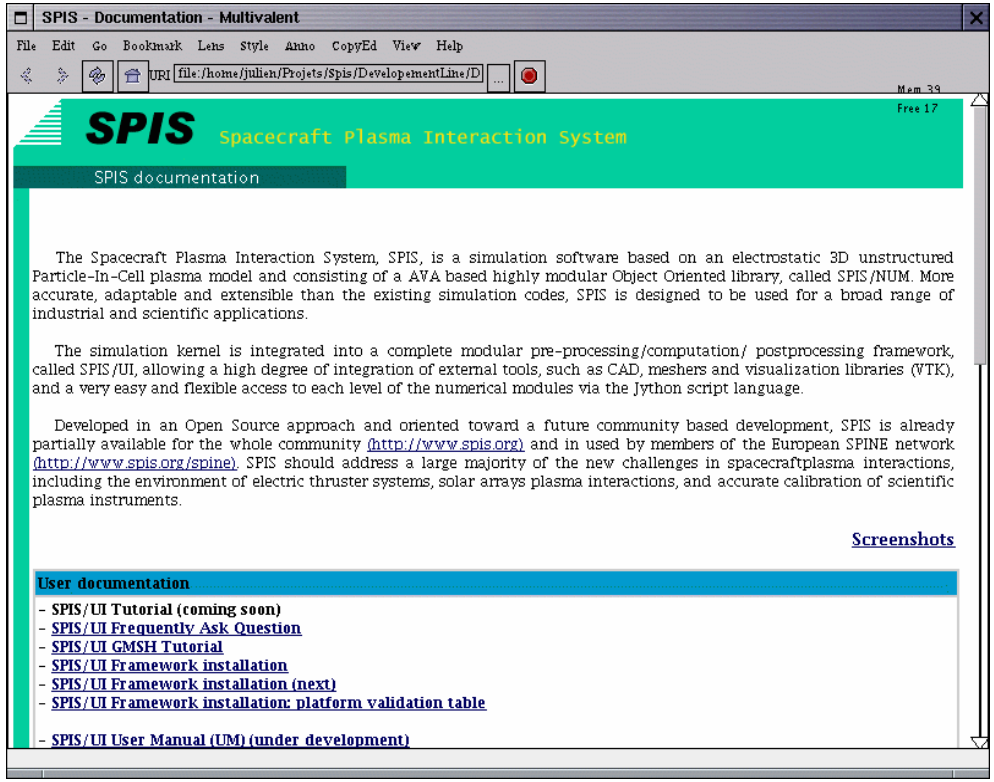
New additional tools

Jext, Java based Python/Java editor



Scripts edition

Multivalent, Java based html browser



Documentation on-line access

Project and data saving

Project saving

- Improvement of the possibility of saving under as simulation project.
  - Ref to the CAD file
  - Properties
  - Group attribution for S/C definition
  - Ref to the mesh file
  - DataFields and MeshFields: to save your data !
  - Global parameters

Individual saving

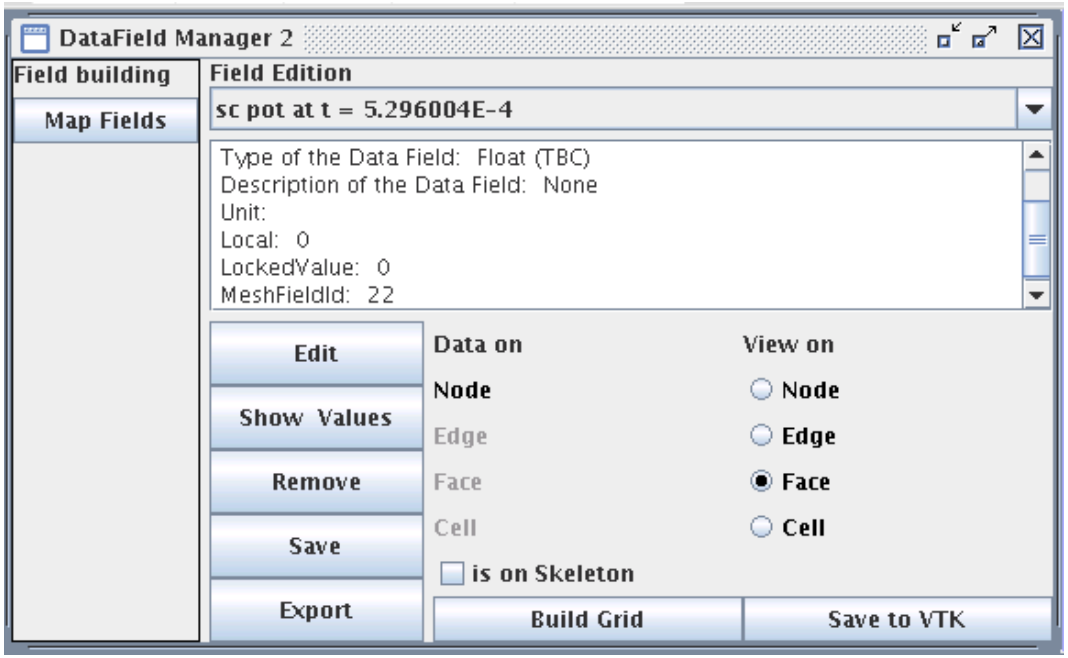
- Properties, groups, DF and MF (for a given mesh)

Be careful, module still under validation !

New postprocessing modules

New DataField manager

- Faster grid conversion
- Optimised vtk data set
- DataField
  - Visualisation
  - Saving
  - Export (ASCII)
- Extended conversion matrix



OUT \ IN	0	1	2	3
0	OK			
1	OK	OK		
2	OK		OK	
3	OK			OK

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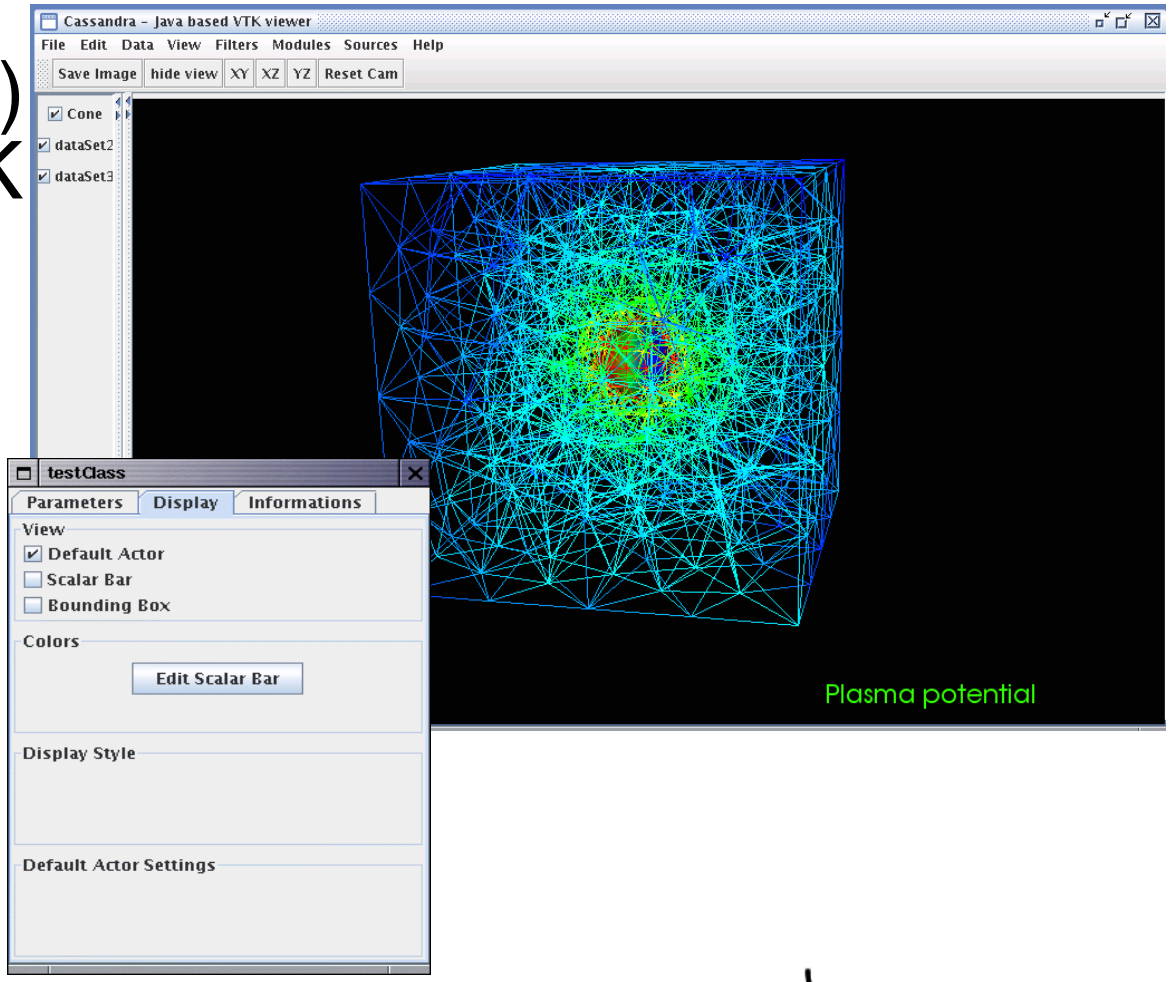
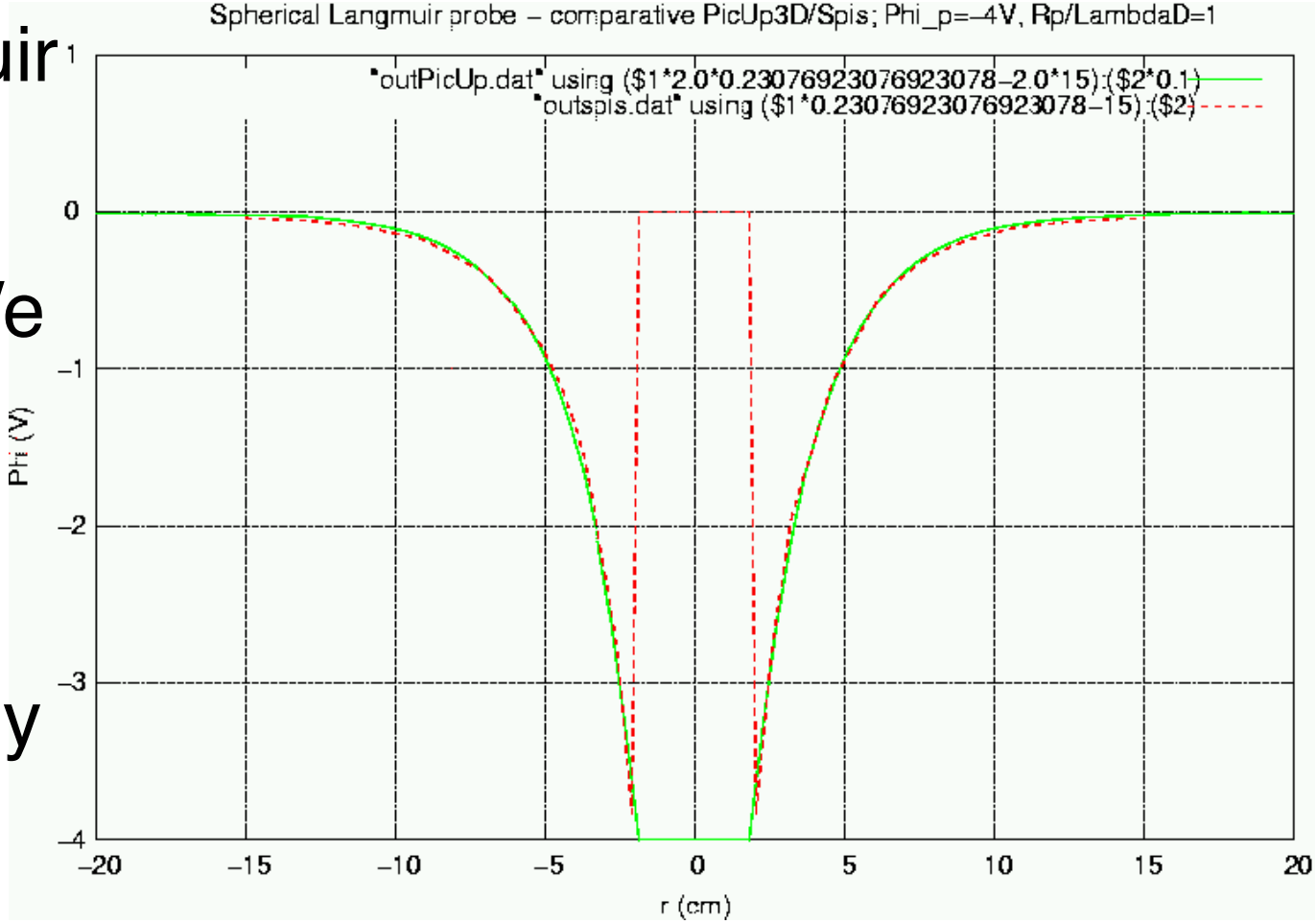
Cassandra, New Java based VTK viewer

- Independent Artenum's project (still experimental)
- Fully written Java + VTK
- Better integration to SPIS than Paraview
- Open to future extensions by independent plug-ins
- Include a visualisation pipe-line manager



Comparison with PicUp3D

- Spherical Langmuir probe
- $R_p = \lambda_D$=2cm
- Φ_P = -4V=10 $k_B T_e/e$
- SPIS in hybrid
- PicUp in full PIC
- Script of probing (line shooting): Scripts/vtkProber.py



Conclusion

- Try to take into a account the requests and feedbacks from the community
- User Interface corrected and improved
- A lot of bugs corrected or in way to be done
- Progressive migration to Java for low level modules
  - -> Future improvement of performances
- Firsts modeling on real cases.
- Migration of the SPINE Web site and the SPIS archives to the ***LibreSource*** platform (see next presentation by S.Jourdain)