IPM Sim 2016 workshop

Discussion sessions – main points

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- A. Scope of the project:
  1. the most general IPM simulation (see slide 6, 2nd remark)
  2. something else? (BIF? Electron lenses? Bunch-shape monitor? E-lens?)
  3. technology/existing codes: python? C++? CST?
- B. Initial discussion of resources:
  1. manpower
  2. code repository (svn, git?)
  3. public webpage
  4. information exchange tool: wiki, sharepoint, github...
  5. documentation (and publications)
  6. budget if any?
  7. next meetings

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- C. Identification of program modules:
  1. Double differential cross section (some work done)
     - remark: in some cases – heave ion hitting light target gas – DDCS for ions may also be needed
  2. rest gas dynamics (gas jet, thermal motion, RF heating of the gas)
  3. external E and B fields (uniform fields, importing field maps)
  4. beam field (gaussian beams, nongaussian beams, multiple bunches for ions, boundary conditions)
     - remark (Rob&Chris): but time dependence of the beam field is important in our monitors. i.e. when the space charge field is present and when it is not. How important the precise tail off of space charge is on the beam profile has not yet been ascertained here, but is an area of future interest for us.
  5. additional transient fields (wakefields)
  6. tracking of electrons/ions
  7. MCP/Channeltron/Semiconductor detector simulation modules
  8. electron background (e-Cloud)
  9. impact of bunch field on cross-section (Stark effect)
  10. rest gas ionization by synchrotron radiation
  11. ultra-relativistic: radiative losses

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- D. Definition of interfaces between modules and to other programs (eg. FEM solvers)
- E. Other tasks
  1. Comparison of various codes (benchmarking).
  2. Code validation experiments.
  3. Correction algorithms.
  4. Theoretical calculations (Giuliano) and comparison with codes results.
  5. Impact on the beam

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- F. Common statement/plan document (MoU)

Additional remarks

- Rob&Chris:
  1. we're interested in the detector performance for different ion species, different gas pressures, beam energies etc.
  2. but the precise range of applicability of the code is important to define. Are we modelling from the precise beam dynamics to the profile as observed on the computer monitor in the control room including all the gas interactions, detector performance, electronics etc?
  3. that validation of the code against theory is not enough, comparison against other (destructive) profile measurements is necessary to truly be confident of the monitor's performance.