Reportrd by Raymond Wasef

Noise Analysis in very long Lines & FMM in ORBIT for Mitigation (J. H.):
No recording of the Q&A

I. H.: The Hermite polynomials were developed by a French scientist to compute space charge. But it was found that it has serious issues and limitations, for example the polynomial order at the boundaries.

J. H.: The paper of Greengard and V. Rokhlin has a detailed prrof of the convergence to any order.

Mixing of Particles due to Noise in Synergia (J. A.):

J. Q.: For the shown phase space plots, which particles did you chose?
J. A.: I chose some particles randomly.

F. K.: When you talk about the study of the kick position, do you have to use equidistant kicks? I think it would be beneficial to put the kicks at extreme betas positions.
J. A: The kicks don't have to be equidistant; they can be put wherever we want. I explored the solution of placing the kicks at extreme betas, but it didn't solve the problem. I also don't know what is the best solution; I think it's more complicated.

I. H.: Have you tried other tunes? The SIS18 has operational tunes close to a structure resonance; this may be the effect of these structure resonances.
J. A.: No we haven't, but we will try it.
G. F.: I am not sure this is the reason because the difference is observed in longitudinal, so it is not clear if it is a transverse resonance effect.
J. A.: It is not clear but we observed that it is caused by the transverse kicks.

J. Q.: What is your space charge solver?
J. A.: That's a 2.5D solver that we copied from ORBIT (2D + longitudinal scaling).

Numerical Model and Scaling law of PIC Noise (F. K.):

O. B.: You derived the formula from your initial distribution. I don't think the noise is related to the initial distribution.
F. K.: I use different initial distributions to see the maximum fluctuations for example, of the electrical field. I also made some tracking to see how it evolves and I saw it is the same.
O. B.: I don't see the real correlation between the initial distribution and the actual noise of the PIC solver after several turns.

Grid noise and entropy growth in 3D PIC simulation (F. K.):

S. M.: I think that the number of kicks per cell has nothing to do with noise.

I. H.: I am also wondering about the correlation, I think we really need a real quantitative theory about it, what I presented is more phenomenological. The way I see this effect, if one puts more kicks, the density distribution changes less between kicks and it is more continuous, so the breakdown of the Hamiltonian flow may be less violent.

G. F.: Does the noise bring the beam to equi-partion?

I. H.: Yes it does, but we cure it by using more particles.