Contributions from J.Qiang, S.Bettoni, J.H.Han, C.Mitchell, R.Ryne, K.Jensen and the audience

Overall -- good progress in code development, particularly with respect to CSR; microbunching (IMPACT) pushed to realistic particle number (e.g., no \textit{a priori} shot noise model needed in principle)

Benchmarking

- Between codes; more effort needed. To our knowledge, Elegant-IMPACT (good agreement) most convincing test is a few years old; new CSR work compared with CSR-TRACK, ELEGANT
- Between codes and experiments -- depressingly little benchmarking effort. Codes appear capable to predict overall growth and nonlinear states of microbunching instability for actual lattices. Is anyone planning to do careful comparison?
- Are current FEL’s so successful that no group is truly interested in establishing accuracy of microbunching codes in various regimes?
Simulation credibility is clouded by a hard and still controversial problem:

- Starting distribution of microparticles and granularity effects
- S.Milton suggests information is available:
  - From SASE fluctuations theory and observations
  - From intensity and fluctuations of spontaneous radiation
  - Can we “backtrack” (theoretically, numerically?) the information upstream of bunch compressor back to injector region? Cathode?
  - Thanks to K-J Kim for supporting and enlightening comments

Understanding and modeling the physics of cathode electron emission is making good progress. We encourage the collaboration between K.Jensen and the rest of the high brightness accelerator and FEL community.

Code documentation seems often to have low priority with developers (with the notable exception of the Elegant group, that provides outstanding support).

- Should community “pressure” code developers (at least at national labs) and their sponsors (e.g., DOE program managers) to give higher priority to reasonable documentation and user manuals?