Minutes of RESULTS, PITZ Physics Seminar, 2018-01-11

Project: PITZ
Participants:
Zeuthen: M. Gross, M. Krasilnikov, J. Good, Q. Zhao, O. Lishilin, H. Qian, H. Huck, R. Niemczyk, C. Koschitzki, P. Boonpornprasert, G. Loisch, Y. Chen, A. Oppelt

1) Agenda
   1. AOB
   2. H. Qian: Beyond ellipsoidal laser shaping

2) Results:
   1. AOB: Please make your mind on the measurement program for the upcoming gun campaign. A course on Particle Accelerator Physics will start next Monday (15 Jan) and it will be presented by Prof. Wolfgang Hillert. The lessons will be given in CSSB Hörsaal (Gebäude 15) every Monday between 10.30h and 12.00h until around 26 March. A video connection will be probably established from Zeuthen (James). Reminder: prepare your input for the gun 4.6 report. Numbering of the report chapters is updated and will be sent around. New gun naming convention: do not put space between "Gun" and its number: Gun4.6.
   2. HQ: Although having advantages over Gaussian and flattop beams, the ellipsoidal laser shaping is complicated and the core slice emittance is still higher than the tails slice emittance (which is important for FELs). A simplification of the ellipsoidal shape is proposed. Experience at LCLS: for pancake photoemission, a "truncated Gaussian" transverse distribution yields 25% better core slice emittance compared to that of a uniform transverse distribution. HQ has performed simulations to compare different shaping models at PITZ. Results: the transverse shaping is the key for the core slice emittance, not the longitudinal shaping. Transversely truncated Gaussian is 30-50% better than transversely uniform distribution. For projected emittance ellipsoidal shape is still the best, but not that much batter. For the current XFEL case (Gaussian longitudinally). With the transverse truncation, the proj.emittance can be improved by 15-20%, while central slice emittance can be 40-50% better. In order to implement that transverse truncation at PITZ, we need a spatial filter and a telescope before the BSA; we do not need to do ideal ellipsoidal, but to try different models.

Protocol prepared by
O. Lishilin