

Minutes of RESULTS, PITZ Physics Seminar, 2018-06-20

Project: PITZ

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1) Agenda

1. AOB
2. R. Niemczyk: Simulation Analysis: Emittance vs. spacial and angular resolution
3. V. Wohlfarth: Rehearsal talk for his Bachelor defence

2) Results:

1. R. Niemczyk: Different binning settings were used for emittance calculation in order to study the angular and spacial resolution limits (and errors) of the slitscan method: expected value error due to our actual resolution is less 1%. More details to be considered for other effects.
2. V. Wohlfarth: PIC simulations of transverse instabilities for PWFA at PITZ. Nonlinear or quasi-nonlinear regime is required to transport long driver beams (longer than the plasma wavelength) through the plasma channel for high transformer ratio experiments. ASTRA, HiPACE and PAMASO codes were used for beam dynamics simulations. HiPACE uses quasi-static approach (plasma and beam fields are decoupled) and cannot simulate beam injection in the plasma (bunch is loaded into plasma on the first simulation step), while PAMASO does not these approximations and is a fully explicit PIC code. Transverse instabilities were observed in HiPACE, and not in the experiment. It was decided to re-check the simulations with PAMASO code. Deviations between PAMASO and HiPACE were observed, but both simulations shown the transverse instabilities which were not initially observed in the experiment. No influence for beam emittance on the instability was observed. Further experiments suggested that transverse instability may depend on the n_b/n_p ratio and on solenoid focusing -> slice focusing should be optimized.

Protocol prepared by
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