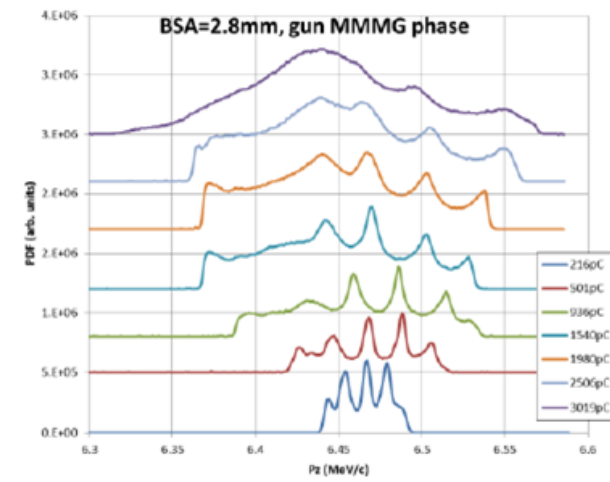
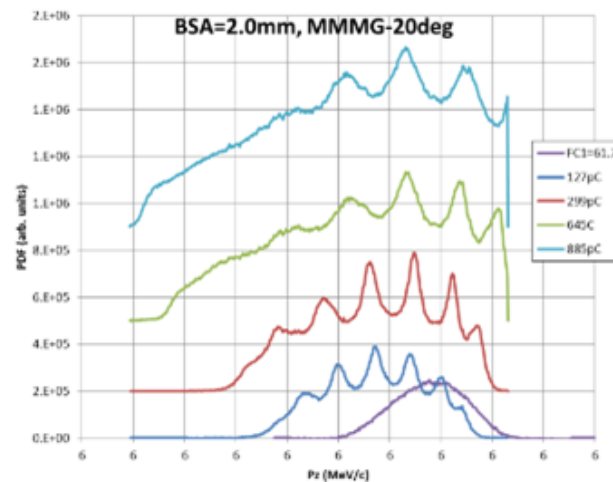
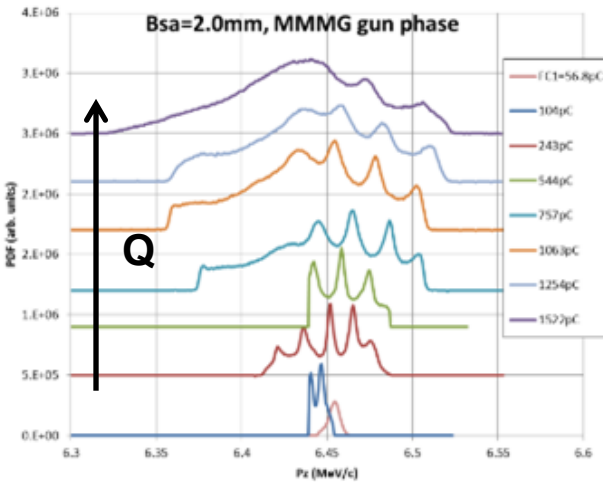
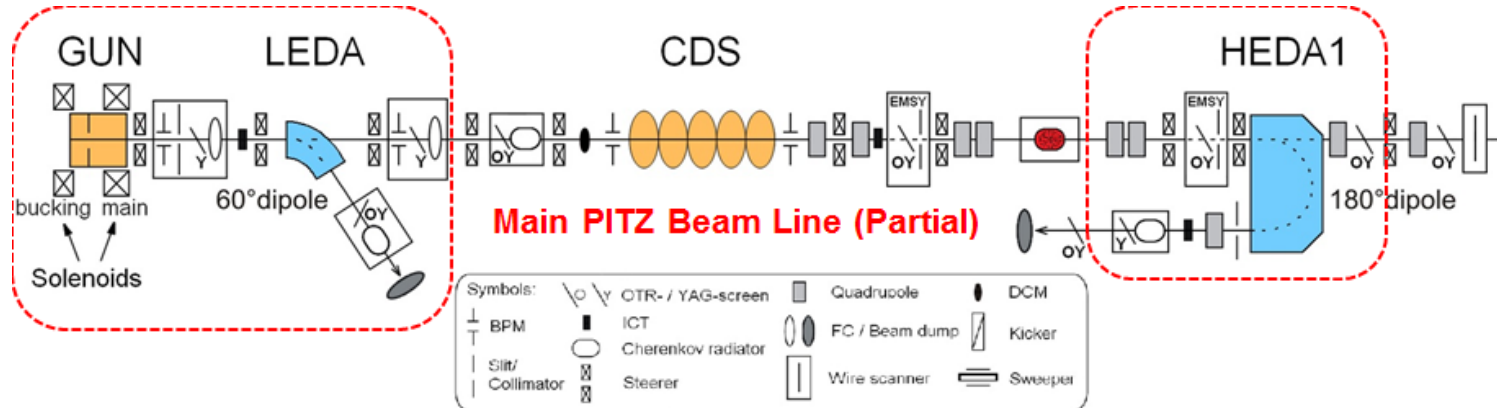


# Study of Modulations in Electron Bunch Momentum Distribution in the PITZ RF Gun

DESY Summer Student Program 2017

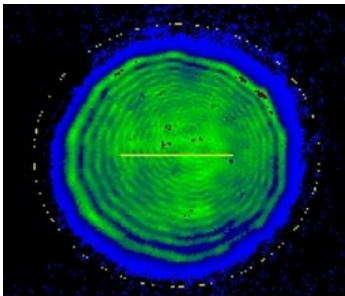


# My goal

try to explain these measurements and reproduce them in simulations

## Possible Sources of the Modulation in Beam Energy Distribution at LEDA and HEDA1

- Cathode physics related effect(s)
- "Ring structure" in transverse laser beam distribution
- Contributions of space charge and image charge effect
- Slight misalignment of regeneration amplifier section in the laser system (e.g., position and/or angle of Lyot filter)



Interference pattern of the laser beam at VC2

## Research Objectives

- Understanding working principles of the PITZ accelerator (beam energy diagnosis and basic cathode physics)
- Learning beam dynamics simulations using ASTRA code
- Investigating parametric dependencies of the modulation in ASTRA simulations with modulated temporal beam profiles at cathode
- Trying to reproduce beam energy modulation measurements at PITZ
- Making a detailed technical report on the topic as a reference for necessary experimental examinations later (e.g., spectrum measurements)

**THANK YOU FOR THE ATTENTION!**

