< □ > < 同 > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > <

Intra bunch train arrival time and compression feedback

Jaroslaw Szewinski¹ Wojciech Jalmuzna² Florian Loehl³

¹IPJ Swierk, Poland

²DMCS, Lodz, Poland

³DESY, Hamburg, Germany

December 2nd, 2008











◆□▶ ◆□▶ ◆臣▶ ◆臣▶ 三臣 - のへぐ

Beam Based Feedback at FLASH

• Aims to stabilize bunch arrival time and beam phase

- Aims to stabilize bunch arrival time and beam phase
- Work done in cooperation of two groups: MSK and FLA

▲ロト ▲帰 ト ▲ヨト ▲ヨト - ヨ - の々ぐ

- Aims to stabilize bunch arrival time and beam phase
- Work done in cooperation of two groups: MSK and FLA
- This topic was also presented on X-FEL seminar on 10th of September 2008 by F. Loehl (overall concept, beam parameters detection)

< □ > < 同 > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > <

- Aims to stabilize bunch arrival time and beam phase
- Work done in cooperation of two groups: MSK and FLA
- This topic was also presented on X-FEL seminar on 10th of September 2008 by F. Loehl (overall concept, beam parameters detection)
- This presentation will focus on electronics development and installation

- Aims to stabilize bunch arrival time and beam phase
- Work done in cooperation of two groups: MSK and FLA
- This topic was also presented on X-FEL seminar on 10th of September 2008 by F. Loehl (overall concept, beam parameters detection)
- This presentation will focus on electronics development and installation







▲□▶ ▲□▶ ▲□▶ ▲□▶ ▲□ ● ● ●

Installation at FLASH

Hardware:

- Two ACB 2.1 boards in the Laser Hut
- One Simcon DSP in the Injector Area (ACC1 crate)
- Fiber optic link between Laser Hut and Injector Area

Software:

- New DOOCS server for ACC1 control (based on Simcon DSP)
- DOOCS server for ACB 2.1 boards
- Adaptive FF server (by Florian)

◆□▶ ◆□▶ ◆三▶ ◆三▶ 三三 のへぐ

Installation layout



ACB 2.1 board

- VME form factor
- FPGA: Xilinx Virtex II Pro (xc2vp30)
- Optical SFP transceiver
- 8x 16 bit input channels (from ADC)
- 3x AD9510 clock managers
- One ICS83940D clock manager



Crate in the Laser Hut (vmesynch3)



Simcon DSP

- Xilinx Virtex II Pro FPGA (xc2vp30, xc2vp50)
- AD TS-201 DSP
- 2x optical SFP transceivers
- 10x 14 bit ADC
- 4x 14 bit DAC
- 32 MB SDRAM
- 36 Mb SRAM



Results

ACC1 Crate (vmedsp1)



◆□▶ ◆□▶ ◆三▶ ◆三▶ 三三 - のへで









(4日) (個) (主) (主) (三) の(の)

◆□▶ ◆□▶ ◆臣▶ ◆臣▶ 三臣 - のへぐ

ACB 2.1 board



Implementation of bunch arrival time feedback



◆□▶ ◆□▶ ◆ □▶ ★ □▶ = = - の < ⊙

















Results

◆□ > ◆□ > ◆臣 > ◆臣 > ○臣 ○ のへ⊙



Results

◆□ > ◆□ > ◆臣 > ◆臣 > ○臣 ○ のへ⊙



Results

◆□ > ◆□ > ◆臣 > ◆臣 > ○臣 ○ のへ⊙



Results

◆□ > ◆□ > ◆臣 > ◆臣 > ○臣 ○ のへ⊙



Results

◆□ > ◆□ > ◆臣 > ◆臣 > ○臣 ○ のへ⊙



Amplitude and phase control in Simcon DSP











Results

Bunch arrival time stabilization



Results

Beam phase without stabilization



590

Installation

Implementation

Results

Beam phase with stabilization



200

SASE intensity



DQC

-2

SASE fluctuations



(ロ)、(型)、(E)、(E)、 E、 の(の)



Thank You