Installation of high precision bunch arrival time monitors in the FLASH linac

F. Löhl

March 13, 2007
Principle of the arrival time detection

The timing information of the electron bunch is transferred into an amplitude modulation. This modulation is measured with a photo detector and sampled by a fast ADC.

Florian Löhl

FLASH seminar, 13.03.2007
Principle of the arrival time detection

beam pick-up signal

electron bunch arrival time:
- early
- correct
- late

voltage modulating the laser pulse amplitude

laser pulse (perfectly synchronized)
Recent results

Jitter between two adjacent bunches: \(\sim 40-50 \text{ fs}\)
- Timing resolution with respect to reference laser: \(< 30 \text{ fs}\)

Arrival time measurement for all bunches in the bunch train possible!
- Plan to implement this into feedback system of LLRF group

Florian Löhl

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Installation work during shutdown:

- Splicing work for optical fiber links
- Exchange of BAM pick-ups
- Installation of electro optical frontends
Comparison of new and old pick-up

old design:

new design:
(by K. Hacker)

Florian Löhl

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Comparison of pick-up signals

old pick-up
(“bump” is strongly orbit dependent)

new pick-up
Slope of pick-up signals

old pick-up

new pick-up

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Installation of electro-optical frontends
Positions of BAMs in the FLASH linac

fiber links of synchronization system

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