Review of the European XFEL Bunch Compression System: Introduction and Concept

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- Introduction and Concept   T. Limberg

- Optic and Tolerances   W. Decking

- Simulation Calculations   M. Dohlus

- Tuning   T. Limberg

- Bunch Compression Options   M. Dohlus

- Diagnostic Overview & FB   H. Schlarb

- Diagnostic Sections Lay Out   C. Gerth

- Diagnostic Tools and Optical Replica   B. Schmidt & M. Yurkov

- Vacuum   N. Mildner,

                                                   T. Wohlenberg, K. Zapfe

Electron bunches out of the gun: 50 A peak current, small energy spread

BC system has to convert that to:

– 5 kA peak current

– < 25 μm Bunch Length (shorter pulses?)

– < 1.4 mm-mrad slice emittance

– < 1 MeV slice energy spread (stay about a factor of two below that from synchrotron radiation in undulator)

– Compensate rf structure wake field induced correlated energy spread as good as possible with rf induced energy chirp for compression (mimimize laser bandwidth)

– avoid high gain for micro-bunch instability

– avoid big projected emittance (> 2.5 mm-mrad)

– < 10% peak current jitter (SASE jitter <10 %)

– arrival time jitter has mainly to be measured and taken care of by the experiments

Bunch Compression Scheme (TADR)