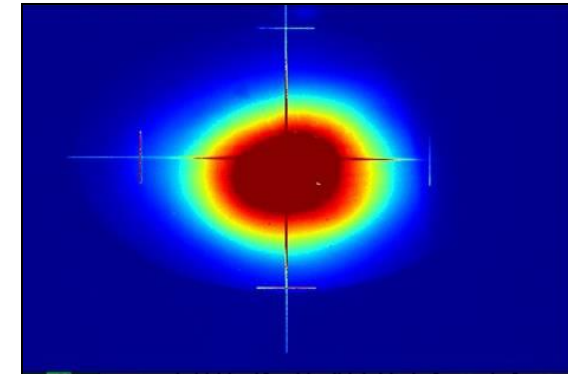


Long Trains, High Beam Loading

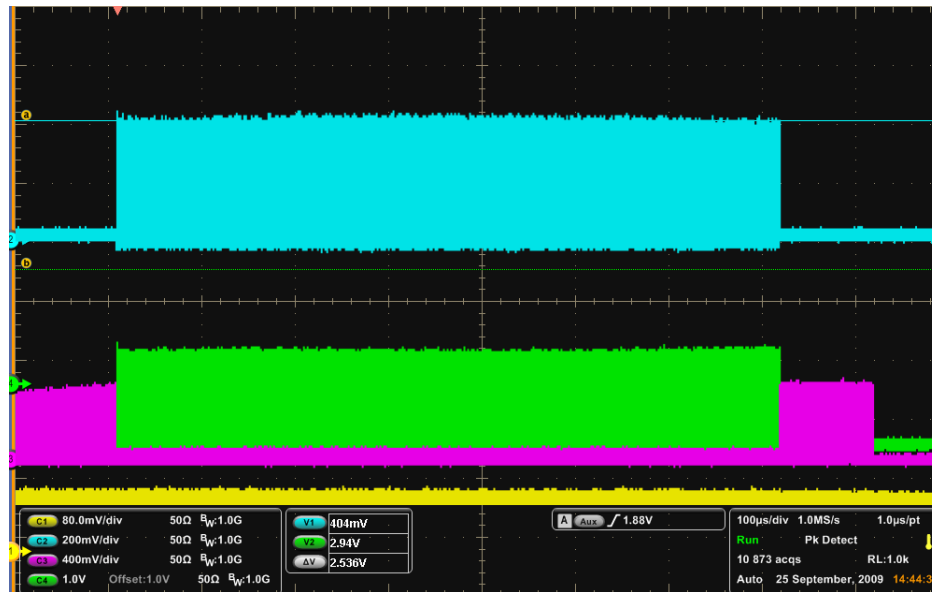
Possibilities for high-current long bunch train running at FLASH

Siegfried Schreiber
DESY



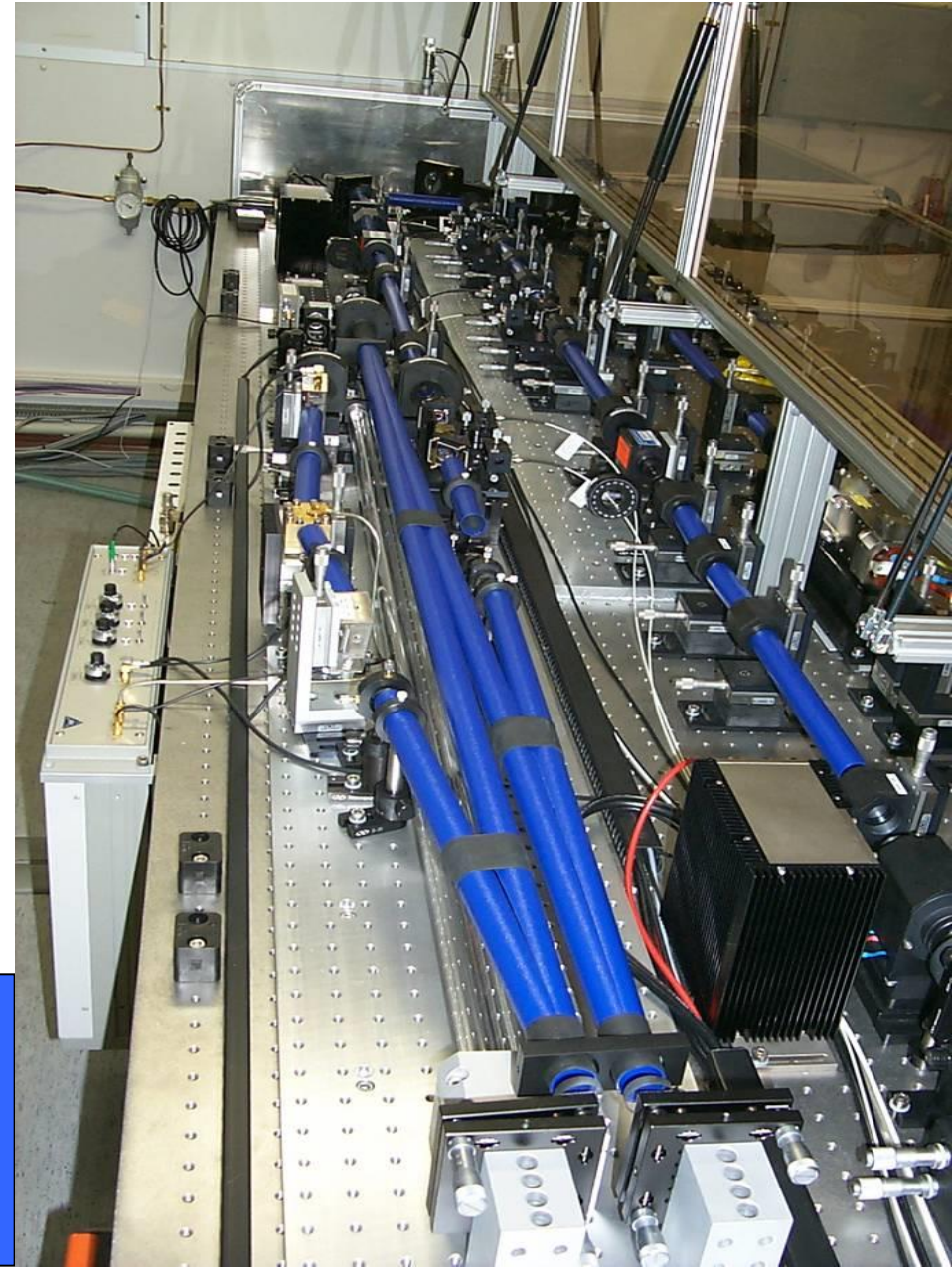
9 mA reloaded

DESY
14 April 2014



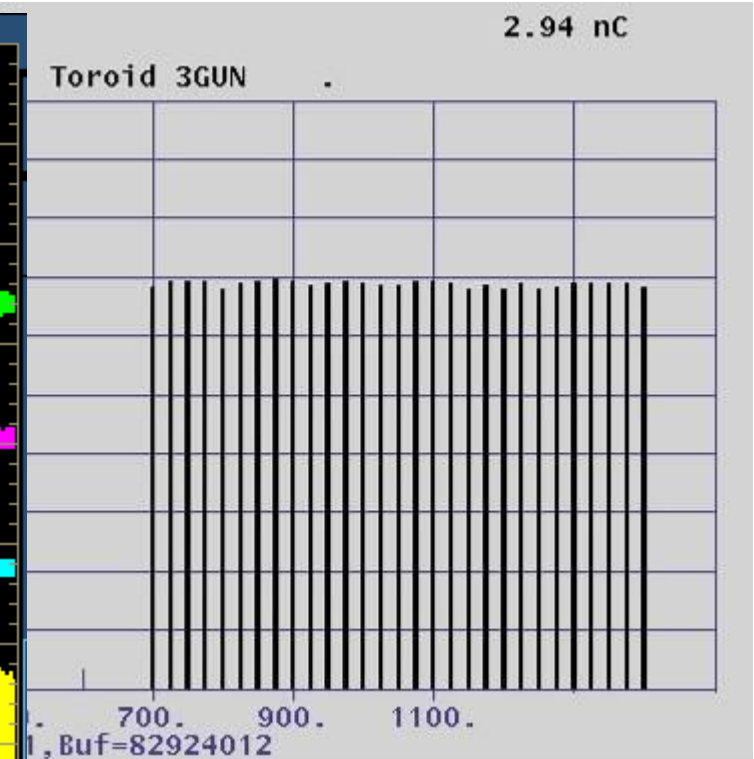
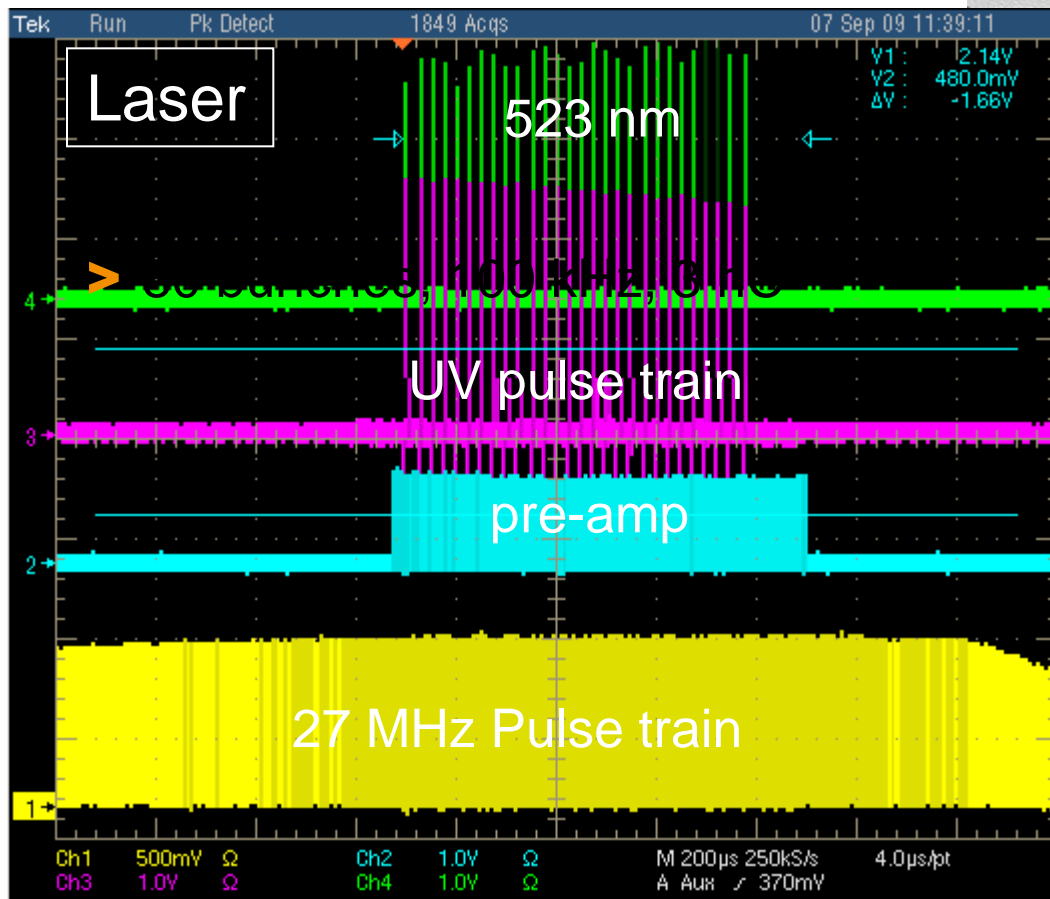
We have two similar lasers available

- > 2 independent Nd:YLF Systems
- > Laser 1
 - > 1 MHz, no 3 MHz option
- > Laser 2
 - > 1 MHz @ 10 Hz,
 - > 3 MHz option @ 5 Hz

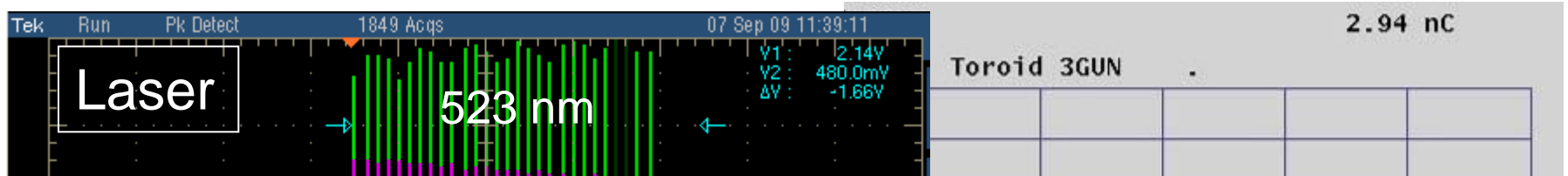


Development
Max-Born-Institute, Berlin
in cooperation with DESY

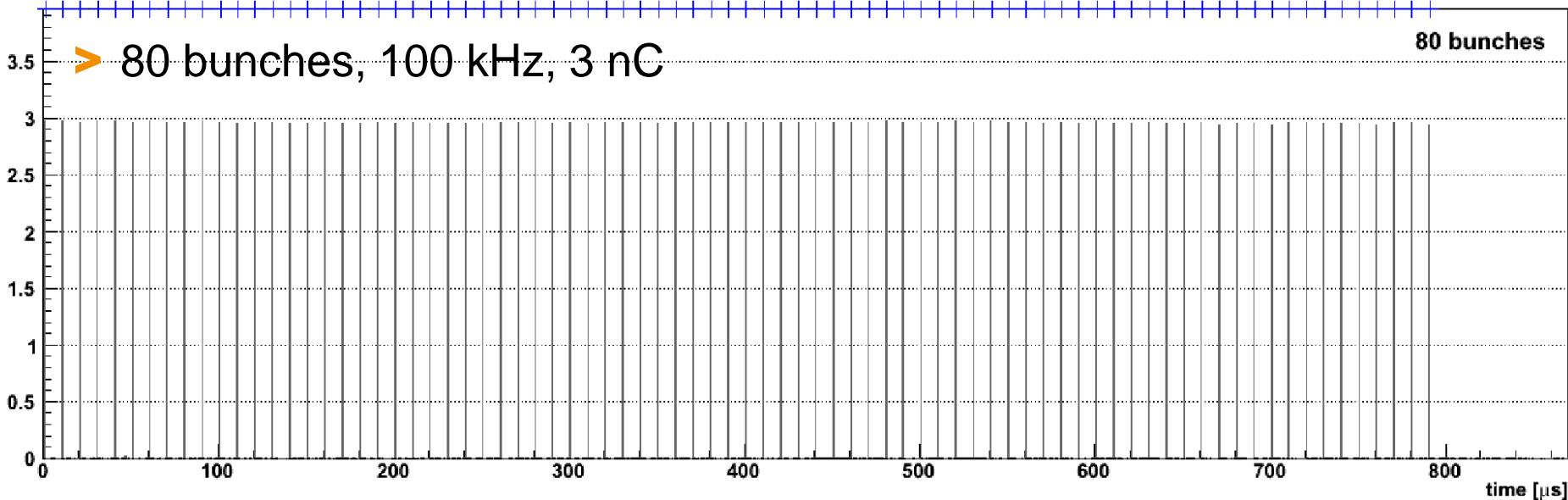
- The laser oscillators run at 108 MHz (laser 1) and 27 MHz (laser 2)
- Pockels-cell 1 picks a 1 MHz train, always long ~ 1ms
- Pockels-cell 2 picks what the operator likes to have, 1 – 800 bunches. Various intra-train rep.rates



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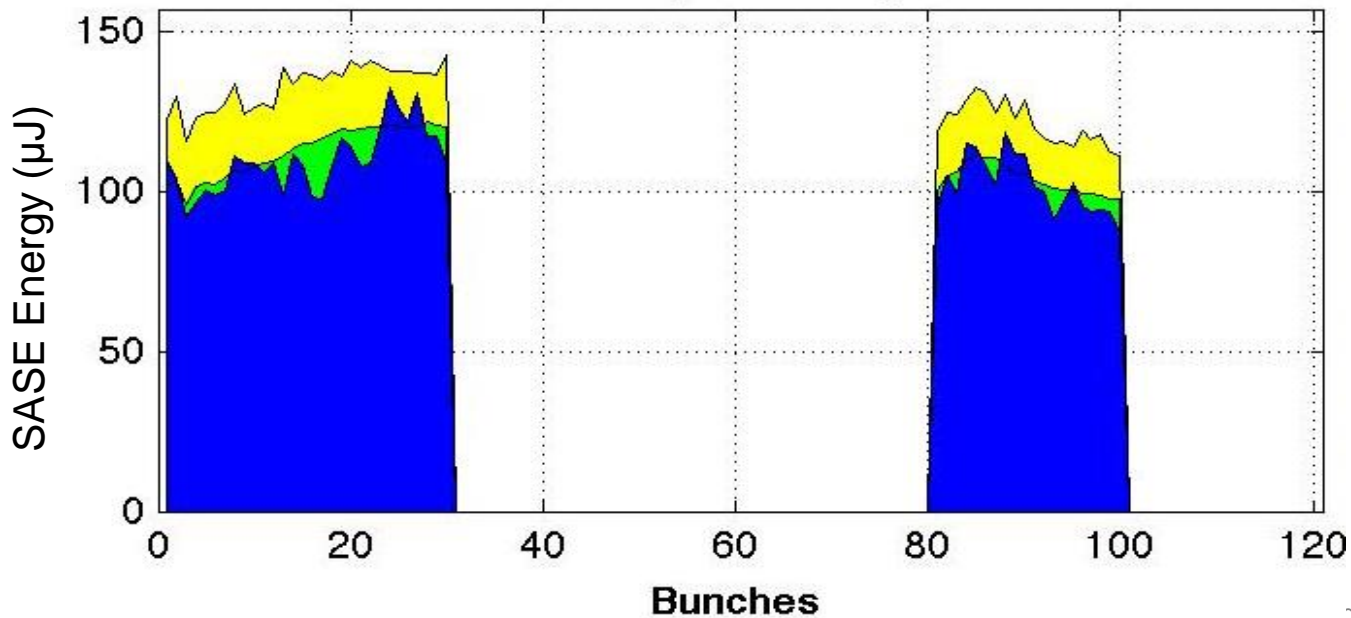
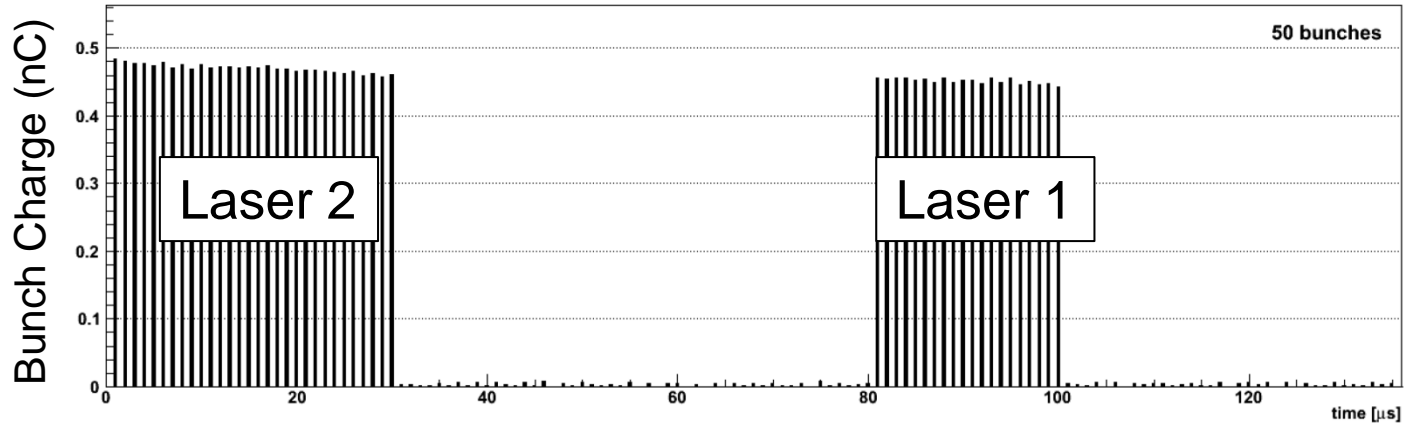
toroid 3GUN [nC]



- > Laser 2 runs with flat train, 3 MHz, 800 us length at 5 Hz



- Both lasers are simultaneously producing beam



1. Run laser 2 with 3 MHz @ 5 Hz
2. Run both lasers interleaved with 1 MHz @ 10 Hz
 - 2 MHz beam @ 10 Hz
3. Upgrade options:
 - Upgrade all four Pockels-cell drivers and power supplies to 4.5 MHz @ 10 Hz
 - Cost estimate: 50 kEuro
 - To be tested: is the power of the present amplifiers sufficient for the load increase of 4.5? 5 Hz?
 - At least 5 Hz should work.
4. Run one laser: 4.5 MHz beam @ 5 Hz
5. Run both lasers interleaved: 9 MHz beam @ 5 Hz
6. Other issues? MPS? ADCs? We need a few uTCA based diagnostics with 81 MHz ADCs.

Trip issue: UV laser energy drops on MPS trip

- Much reduced with new BBO's
- To be tested with 4.5 MHz beams
- AOM UV pulse picker: upgrade to 4.5 MHz required

