

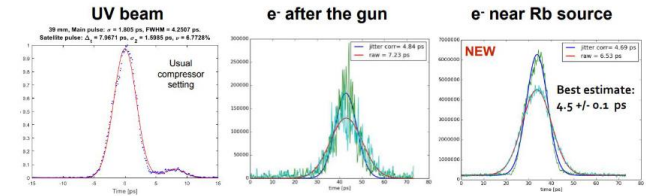
# E- bunch length and jitter measurements

## Motivation

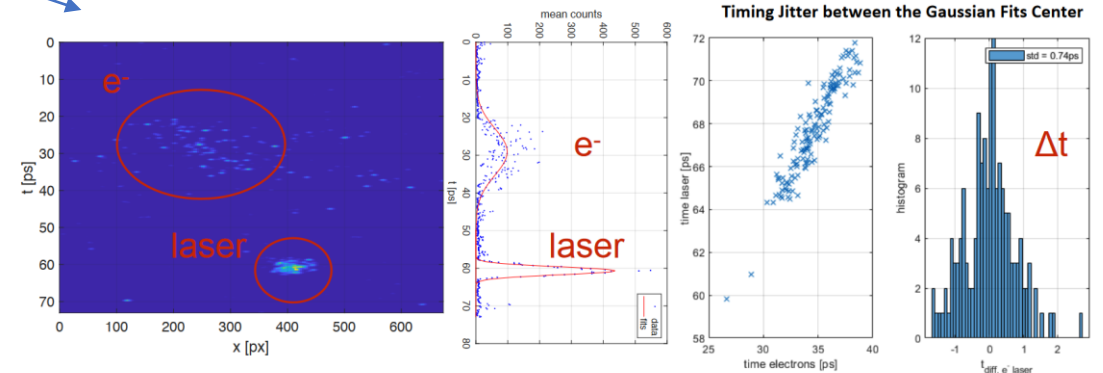
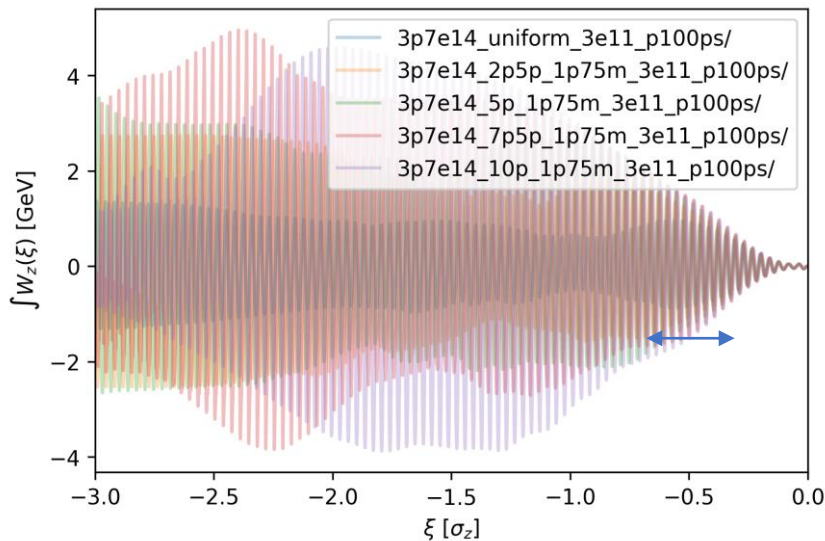
- 1) Sanity check before starting a campaign.  
Ensuring good bunch density at injection
- 2) Are we always injecting charge at the right wakefield phase?
- 3) Is timing jitter the source of the variations of the witness charge? Sometimes accelerated electron energy was stable. Sometimes not so much. Is it the wakefields, is it the timing, the diagnostics?

Check that everything is alright.  
May need the number for publications.

Previous measurements (4.5 pm 0.1) ps →  
(1.35 pm 0.03) mm  
corresponds  $\lambda_{pe}$  at 6e14/ccm (1.35 mm)  
e.g. at 2e14/ccm



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See also Edu's slides @ collaboration meeting and Stefano's slide in backup.



Day 10.09.2019, e- 650pC

A. Bachmann

Ensure that timing jitter is still small  
→ May want to draw conclusions on wakefield reproducibility.

### **Ideally scenario:**

quick every day check for the exact bunch parameters of that day → BTV350 and the upstream streak camera

→ Requires sufficient light yield with all e-bunch parameters, quick alignment (optics changes)

Challenge: insufficient signal yield (transport line, alignment design,...?)

Alternative: check with only high(est) electron bunch charge.

Screen angle reproducibility

Beam vector identical to He:Ne

Suggestion Patric:

- align HeNe onto p+ bunch trajectory (BTV 350 to IS2)
- align optics to SC with HeNe
- align e-beam onto HeNe at BTVs 350 and 353, OTR screen at 350 (not chromox!) with waist at 350.

That way visible radiation for all beams follow the same path. We can then look at all three beams on the SC and on the CCD

→ Then evaluate the situation

### **Alternative option:**

Move streak camera next to BTV 350 and perform measurement once/few times (e.g. as a function of compressor settings and e-gun parameters)

→ Has been done in the past