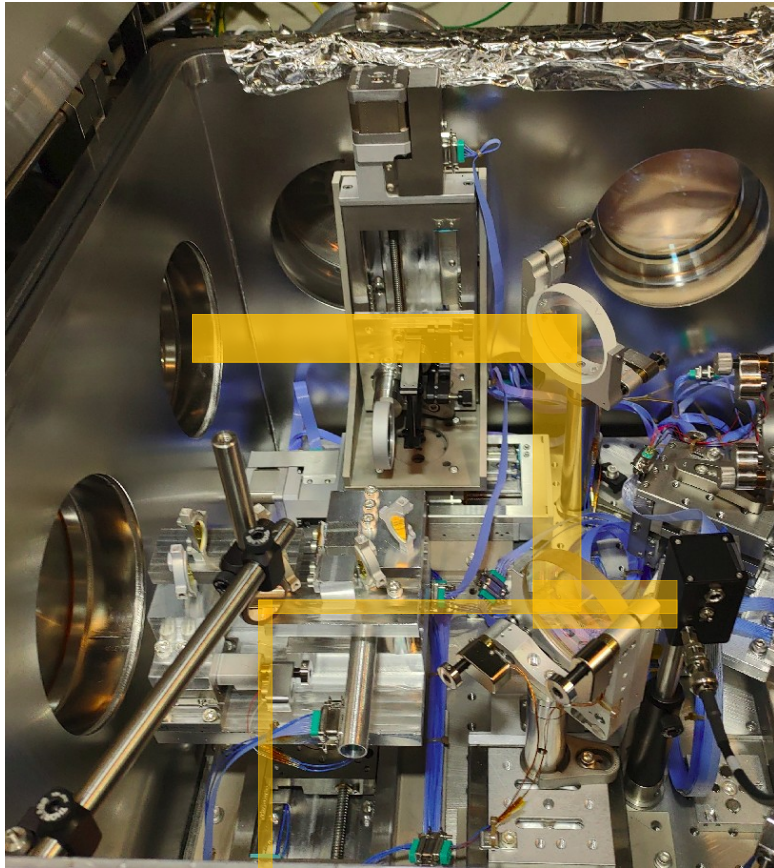
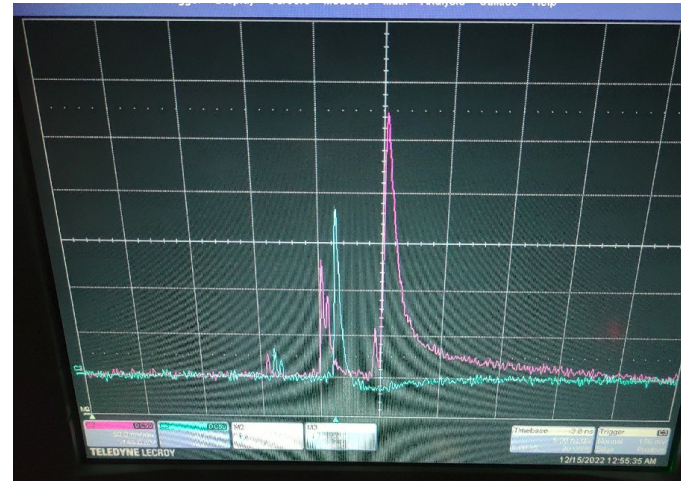


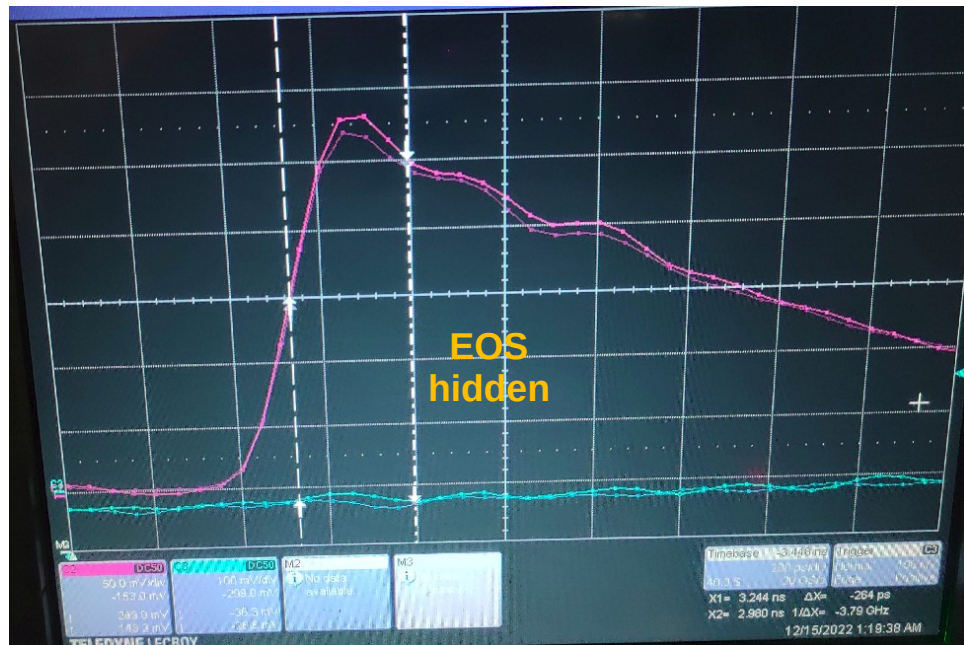
EOS vs E-320 timing measurement



- General idea: as long as laser and e-beam co-propagate, they remain timed
- USHM placed on e-beam axis, small mirror directs EOS probe beam down through the hole towards diode (on e-beam path)
- Both main laser and EOS probe beam are measured with the same diode
- Trigger signal is generated from other EOS beam (remains timed to EOS even if delay stage moves)



Scope traces for different delay-stage settings



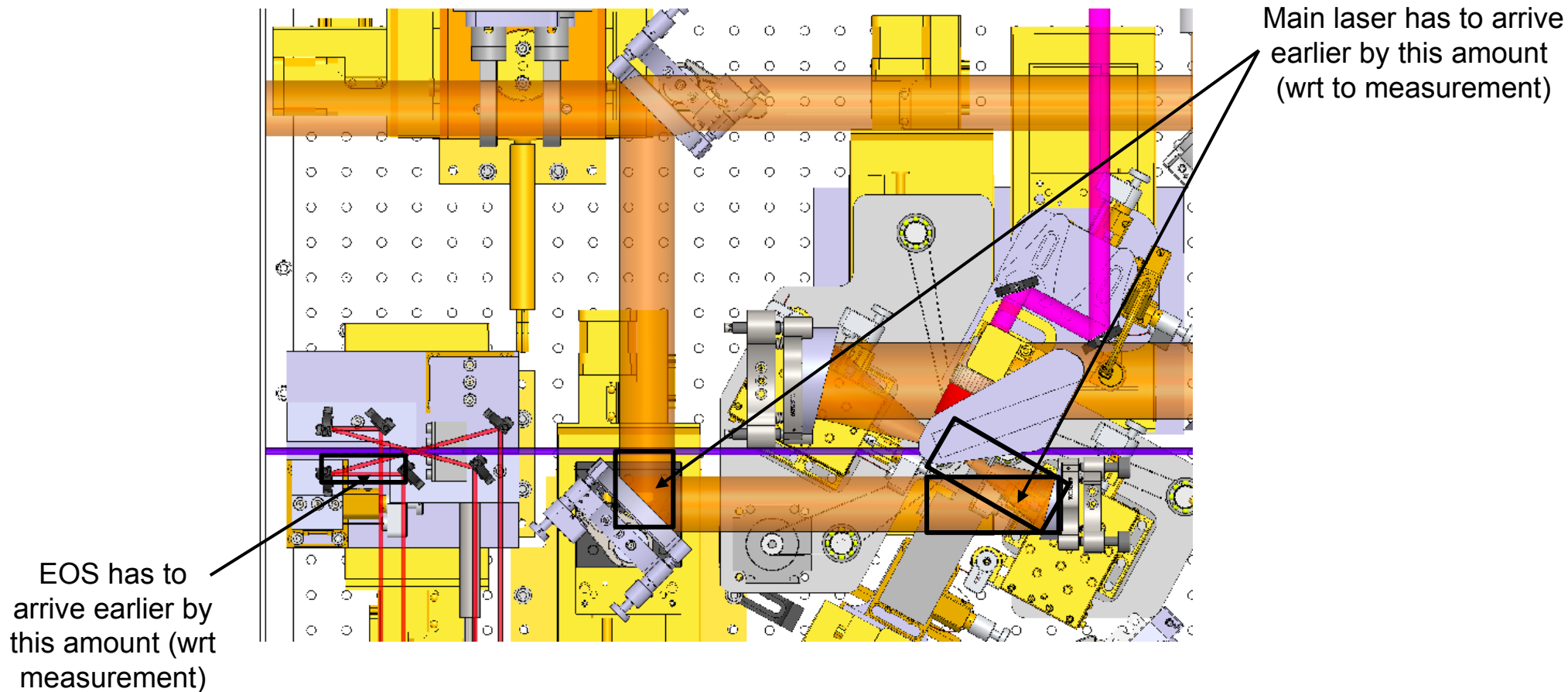
Shortest possible delay:
main laser arrives ~260ps earlier than EOS



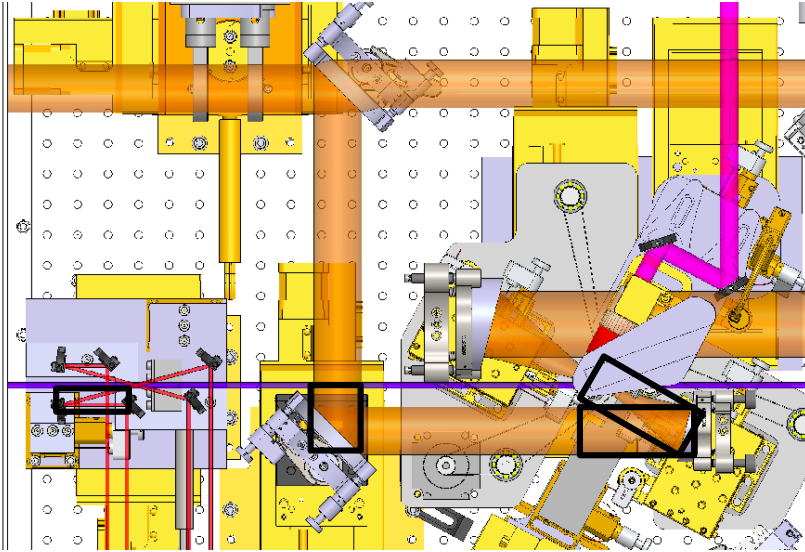
Longest possible delay:
main laser arrives ~740ps later than EOS

Two most extreme delay-stage settings

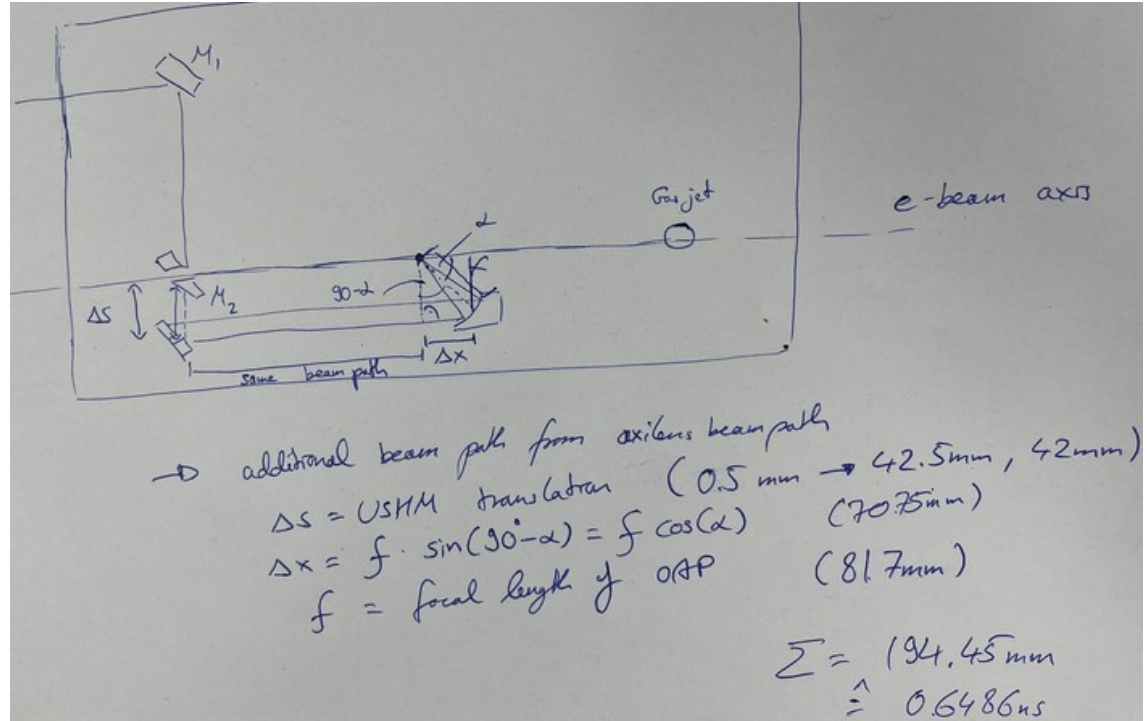
Timing measurement configuration vs. experiment



Main laser delay estimate



EOS delay:
measured with caliper



Previous calculation from confluence
(Elias Gerstmayr)

Calculation in elog (Dec 14, 2022)

```
6:55 pm - mirror installed for EOS/main laser timing, break started
9:08 pm - PROBE delay at 76
        Trigger: EOS 1
        Timing measurement: EOS 2 only - 3.230 ns relative to trigger (file name 6 & 7,
D:/Waveforms)
        Add main: delta t is 746 ps +/- 50 ps (file 7 & 8)
9:29 pm - PROBE delay at -74
        delta delay t is -264 ps (file 10 & 11)

9:47 pm - 1st EOS mirror to 2nd EOS mirror: 50mm; 2nd EOS mirror to crystal: 76mm; 2nd EOS mirror
to newly inserted mirror: 56mm

Main laser delay wrt measurement: 194.45mm
EOS delay wrt measurement: 106mm
-> 194mm-106mm = 88mm
```

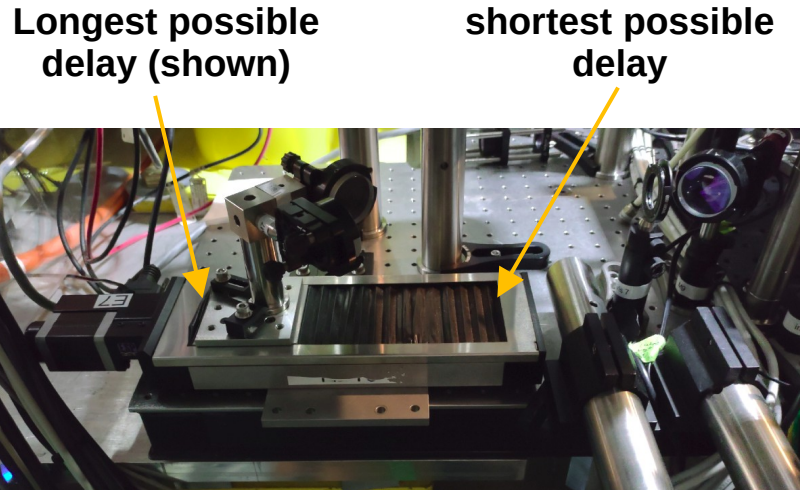
264ps: 79mm

BNC cable used: LMR-200

Diodes used: GaAs PIN Detector ET-4000 www.eotech.com

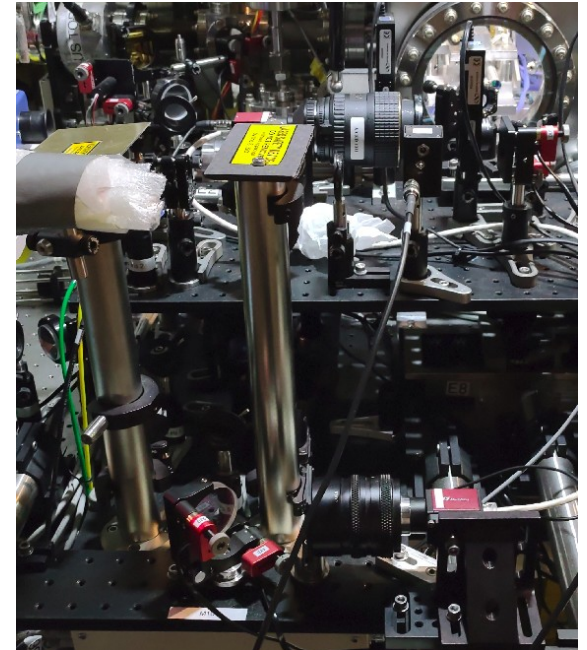
Moving the delay stage by 0.5" upstream (longer delay) should be enough (means ~25mm ~ 83ps additional delay) → easier to move by 1" though

Delay stage, trigger signal pickup



← Stage needs to move to longer delays (which is easy)

Physical position of master delay stage



Position of diode for trigger signal: 2nd EOS laser