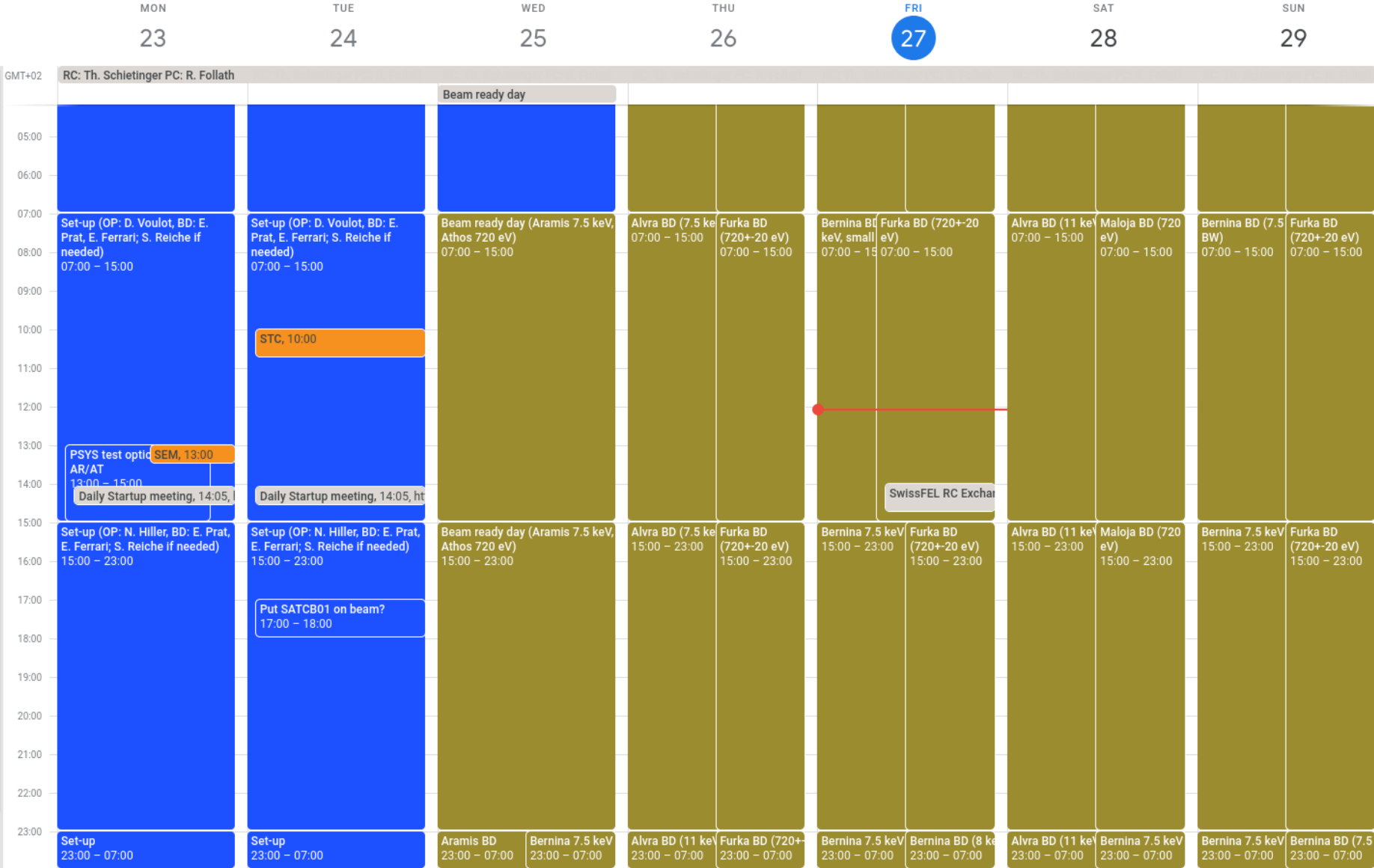


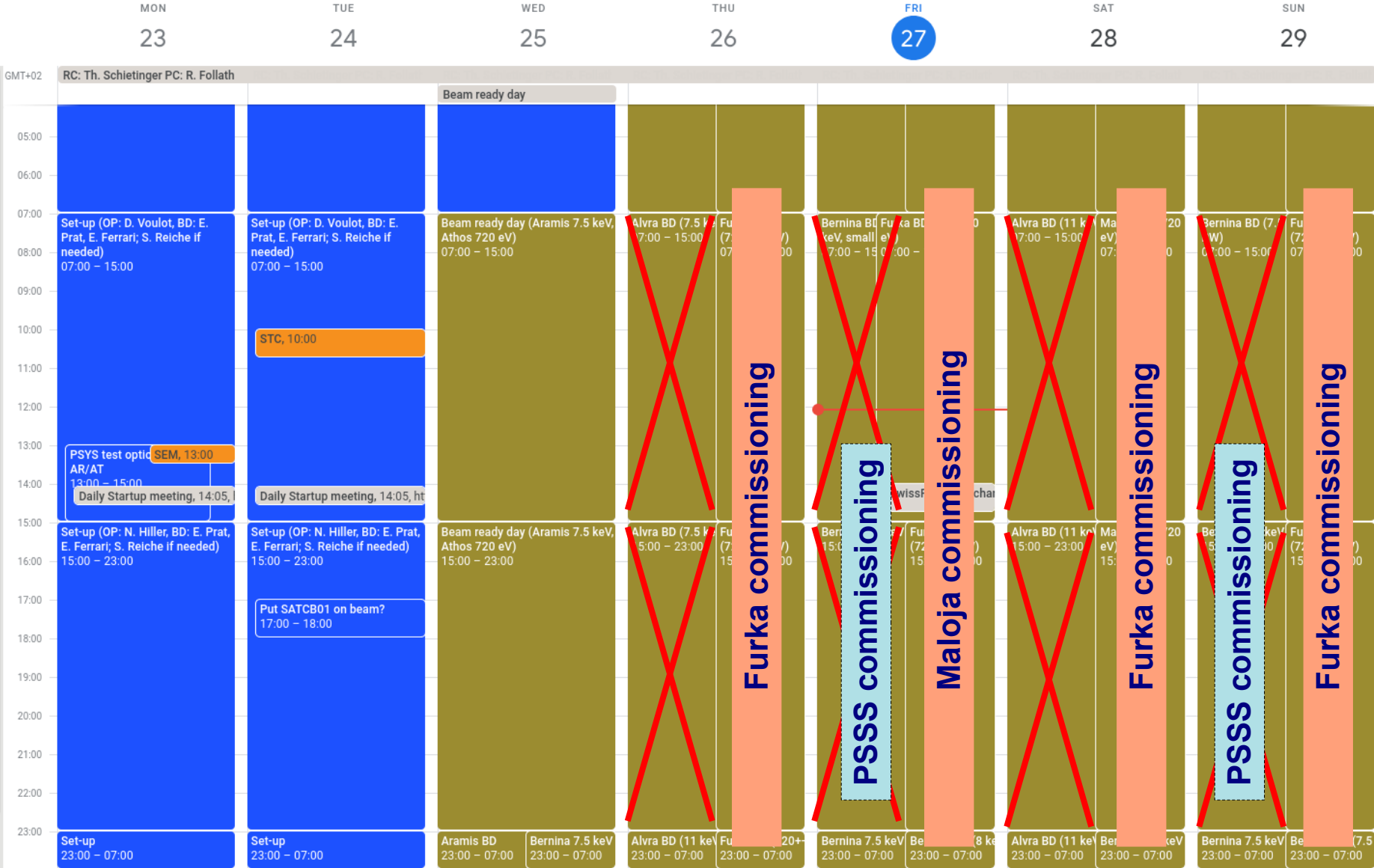
SwissFEL Operation – Run Coordinators' Report Week 34/2021

- **Week overview**
- **Aramis and Athos setup**
- **Issues**

Calendar

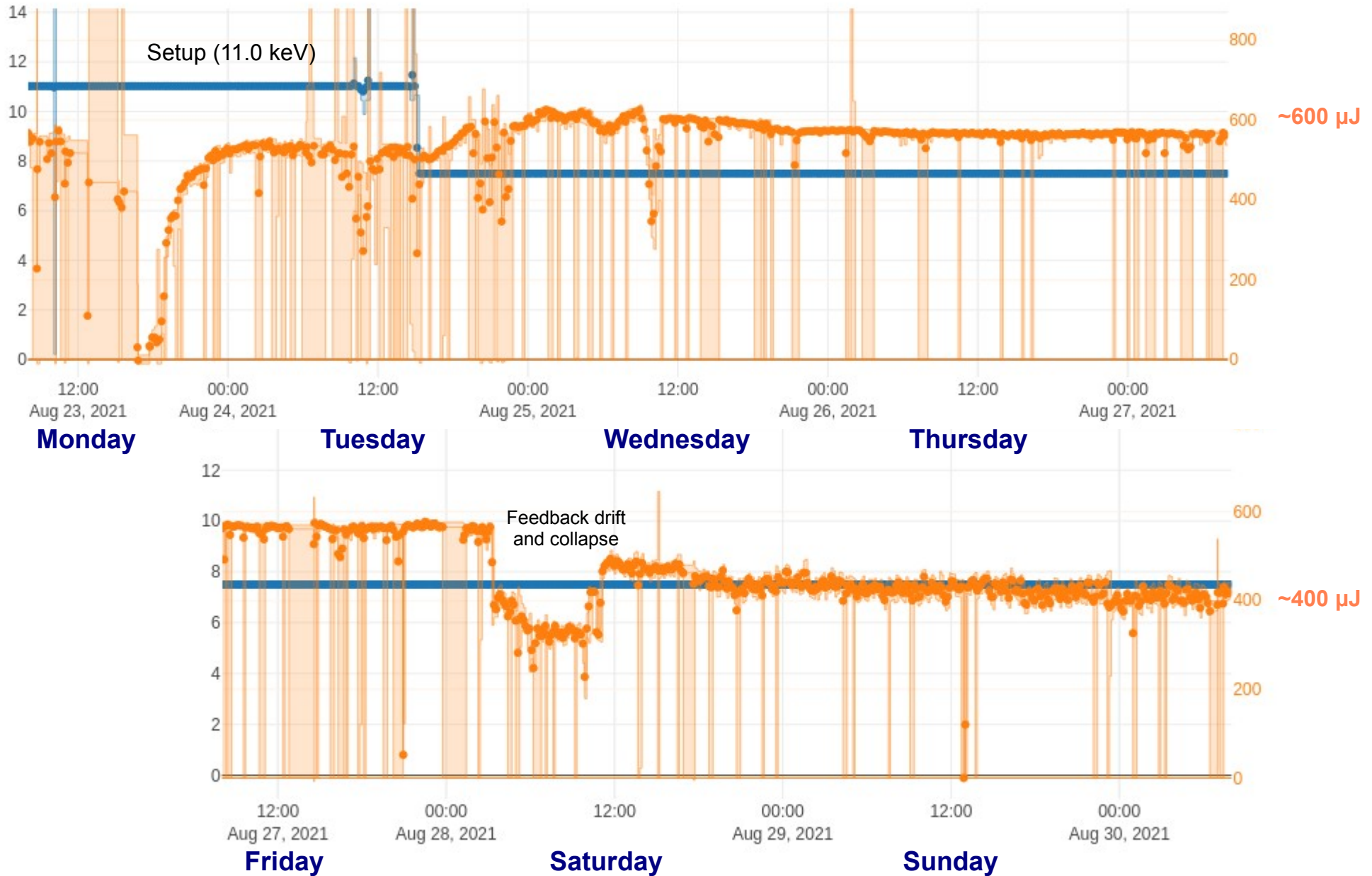


Calendar

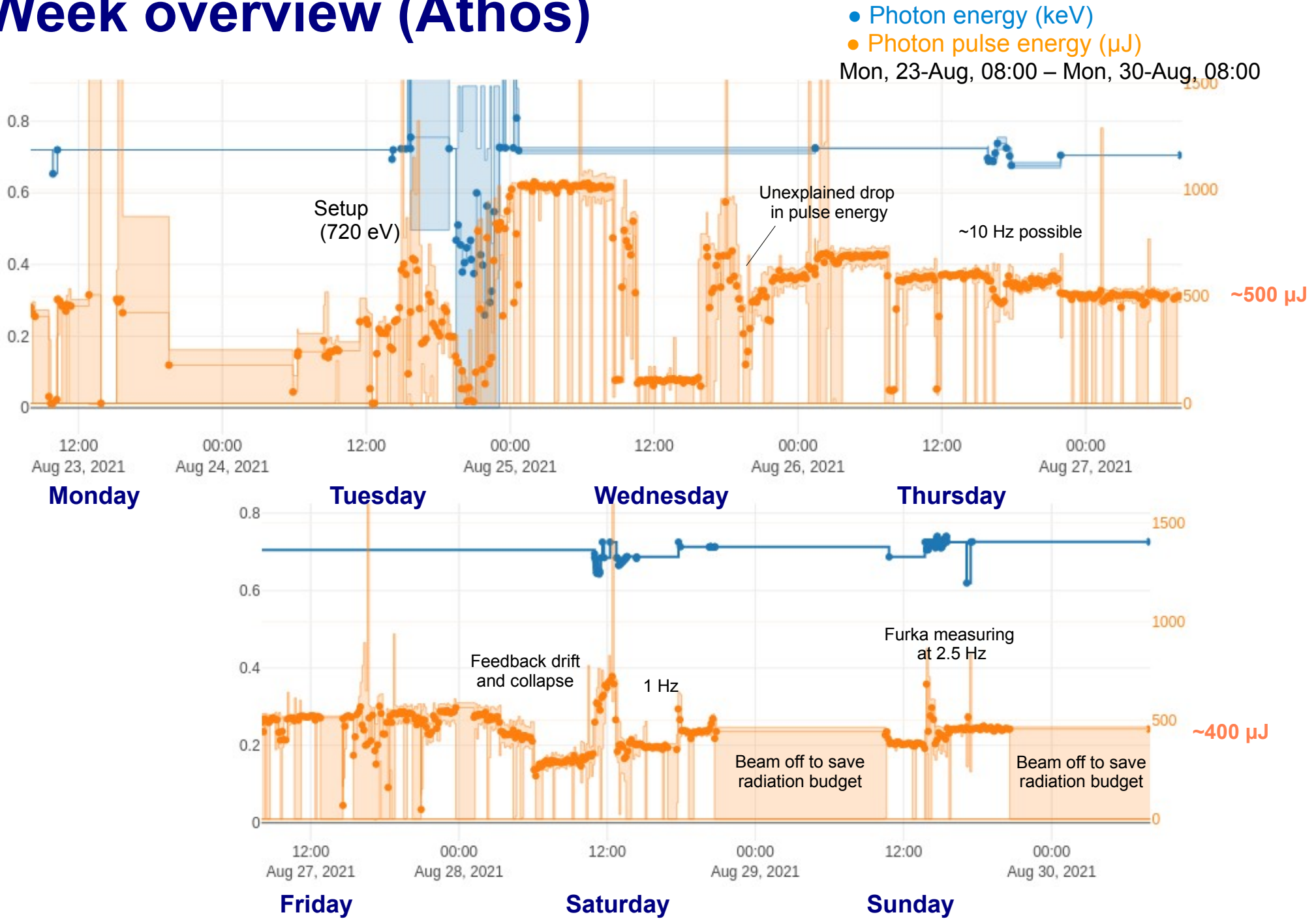


Week overview (Aramis)

● Photon energy (keV)
● Photon pulse energy (μJ)
Mon, 23-Aug, 08:00 – Mon, 30-Aug, 08:00



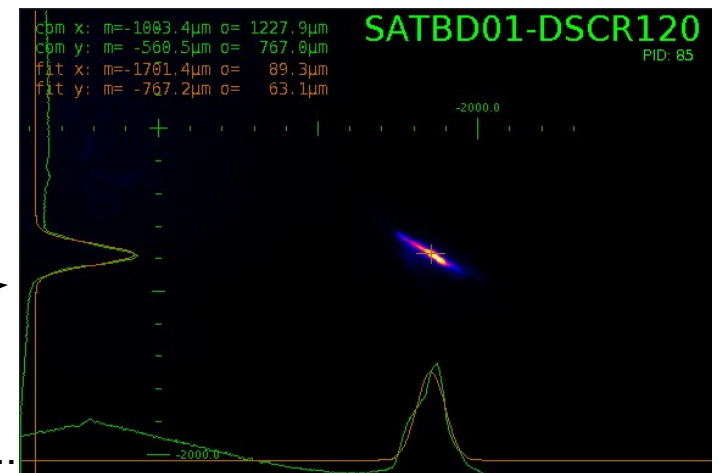
Week overview (Athos)



Machine setup

S. Reiche, E. Ferrari,
E.Prat, N. Hiller, D. Voulot

- Restored machine after startup already had 550 μJ in Aramis (11 keV), 450 μJ in Athos (720 eV), **100 Hz operation possible after some loss optimization.**
- **Aramis setup (Monday):**
 - S30CB12 back on beam
 - Systematic setup gives about 450 μJ :
 - Standard measurements (emittance, bunch length etc.)
 - adjustment of slice emittance with gun solenoid
 - Dispersion correction
 - With random optimization of undulator matching and orbit up to **620 μJ** eventually.
 - Bandwidth down to 1.3 per mil after adjustment of compression.
- **Athos setup (Tuesday):**
 - Emittance and matching, correction of linear tilt
 - Systematic setup gives more than **1 mJ**.
 - Retuning of optics to have less losses (including sextupoles)
 - Unknown orbit coupling gives a strong tilt
 - Beam-based alignment (Tuesday evening)
 - Many attempts at loss reduction throughout the week...



Issues

Killer issues:

- **Aramis: bad vacuum** in optics tunnel prevents photon beam beyond frontend!
- **Athos: losses** prevent rep. rates higher than 10 Hz, later 1 Hz.
 - Many shifts spent on optimizing with limited success.
 - Friday evening event (see below) worsened the situation even further...
 - Better real-time diagnostics urgently needed.
 - Mid-term we need to understand and fix the underlying problems!
- **Unknown event** causing feedback drifts (Friday evening, 20:30)
 - Seven hours later breakdown of lasing.
 - Restore efforts only partially successful, pulse energy recovered, but losses in Athos even worse (1 Hz barely sustainable).
 - Underlying cause remains a mystery, under investigation...

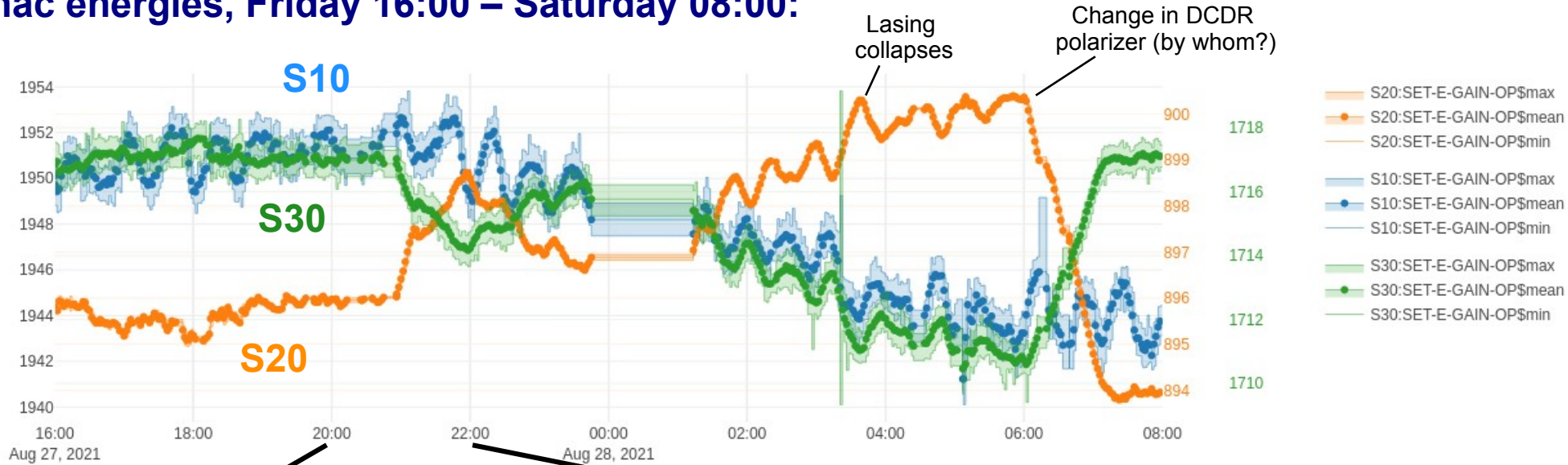
Minor issues:

- No arrival time feedback (controls problem with laser stage movement).
- SATCB01 not yet put on beam (not strictly required, needs more conditioning)
- Frequent interlocks from SATCB01 RF conditioning.
- MPS interlocks from ICT invalid counts
 - New software was uploaded by D. Llorente / F. Löhler – currently under testing
- E-loss measurement not reproducing gas detector reading (Aramis)
- Sudden drop (by 50%!) in pulse energy in Athos (Wednesday 18:30), not understood!
- DRPS detector 1401 needed replacement (1 hour downtime on Friday)

What happened on Friday evening?

ELOG 21005
for more details...

Linac energies, Friday 16:00 – Saturday 08:00:



Detail Friday 20:00 – 22:00

