First feedback from the 2024 Pb loss maps - Preliminary analysis

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29 October 2024 – ad-hoc BLM Thresholds Meeting (Pb run 2024)

Outline

➢ Different sets of Loss Maps performed for Pb 2024 over the last weekend

➢ Example loss maps for CH, AM, VR (comparison with 2023)

➢ Example envelopes of of normalised and upscaled BLM signals (comparison with 2023)
  ○ For IR7 collimators
  ○ Interlocked BLMs

The loss maps that are discussed here are from Flat Top using RS09

Available Loss Maps with Pb so far

➢ Multiple loss maps performed over the last weekend (26-28 October)

➢ 1st set of Loss Maps 26/10/2024 (~04:20-04:50) after crystal set up
  ○ CH, VR, AM at FT
  ○ TCTV.2 sticking out → off centered, fixed later
  ○ Excitation too weak, some cases signal at background level

➢ 2nd set of Loss Maps 26/10/2024 (~10:00-10:40)
  ○ CH, AM
  ○ TCTV.2 fixed, higher excitation, but TCLA was high

➢ 3rd set of Loss Maps 28/10/2024 (~03:00-07:00)   **Cleanest ones**
  ○ CH, VR, AM at FT and at collisions
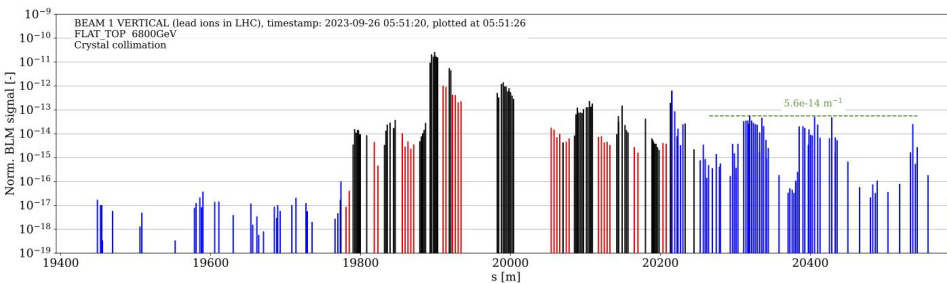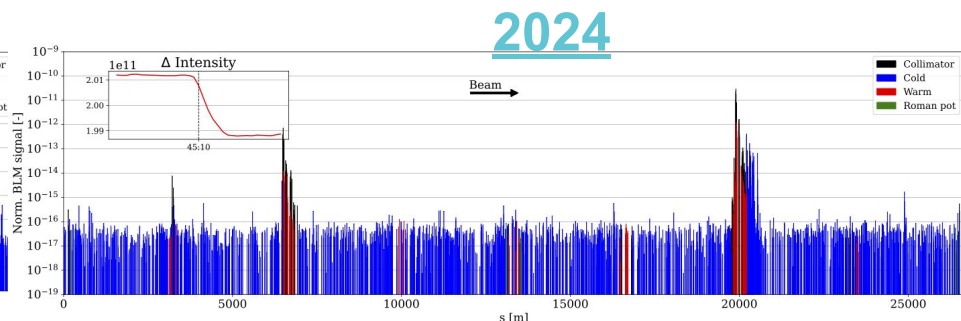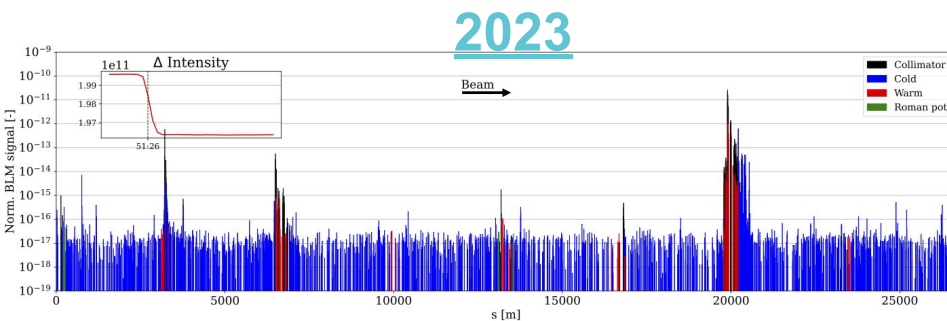 ○ **TCLA** opened at **13 sigma**, higher excitation

Example Pb loss maps 2023vs2024

Channeling

Normalisation with the instantaneous rate of lost charges

$$\text{BLM}_i^{\text{norm}}(t_0)\left[\frac{\text{Gy}}{\text{charge}}\right] = \frac{\text{BLM}_i(t_0)\left[\frac{\text{Gy}}{\text{s}}\right] - \text{BKG}_i\left[\frac{\text{Gy}}{\text{s}}\right]}{\left|\frac{\text{dI}}{\text{dt}}(t_0)\right|\left[\frac{\text{charge}}{\text{s}}\right]}$$

t_0: timestamp of maximum losses
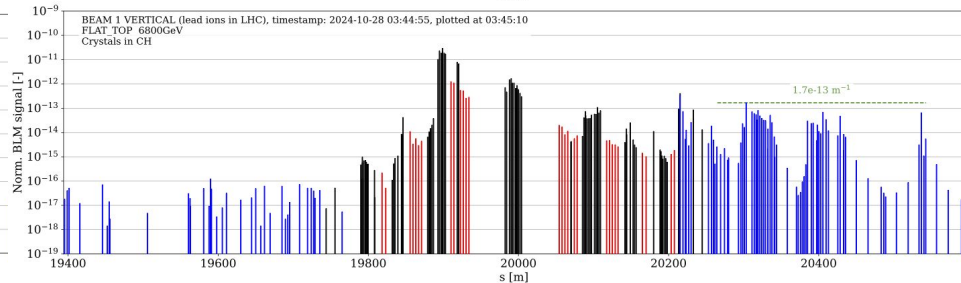
2023

2024

- Worse cleaning in 2024 wrt 2023
- Lower/higher losses in TCT.2/IR3 wrt 2023
  - Difference in TCT.2 expected since TCT.2 settings more open, on_disp knob is ON
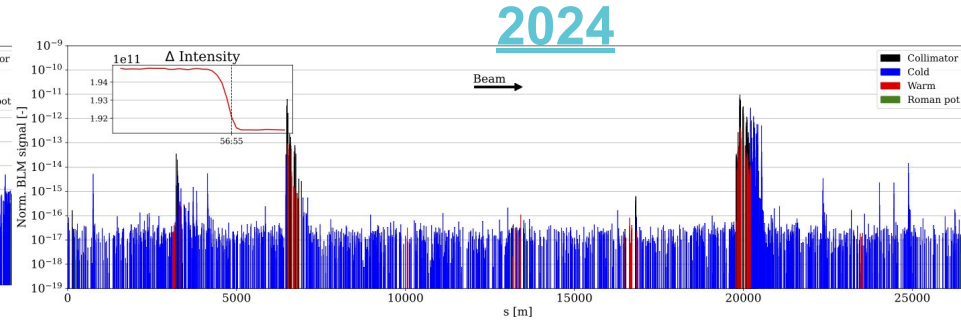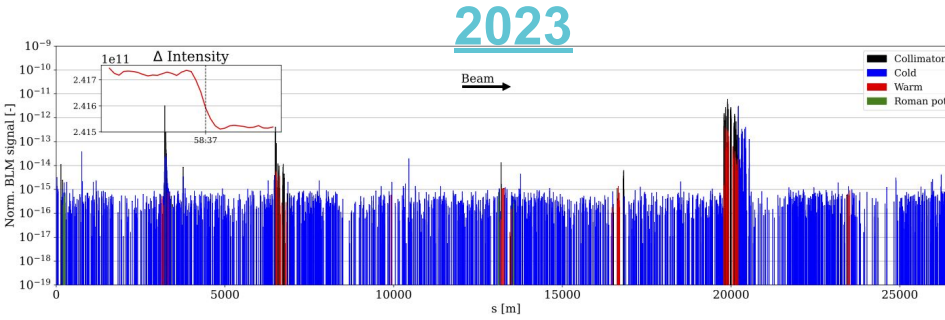
# Example 2024 Pb loss maps
Volume Reflection

Normalisation with the instantaneous rate of lost charges

$$\text{BLM}_i^{\text{norm}}(t_0) \left[\frac{\text{Gy}}{\text{charge}} \right] = \frac{\text{BLM}_i(t_0) \left[\frac{\text{Gy}}{\text{s}} \right] - \text{BKG}_i \left[\frac{\text{Gy}}{\text{s}} \right]}{\left| \frac{\text{dI}}{\text{dt}}(t_0) \right| \left[\frac{\text{charge}}{\text{s}} \right]}$$

t_0: timestamp of maximum losses

2023   **2024**
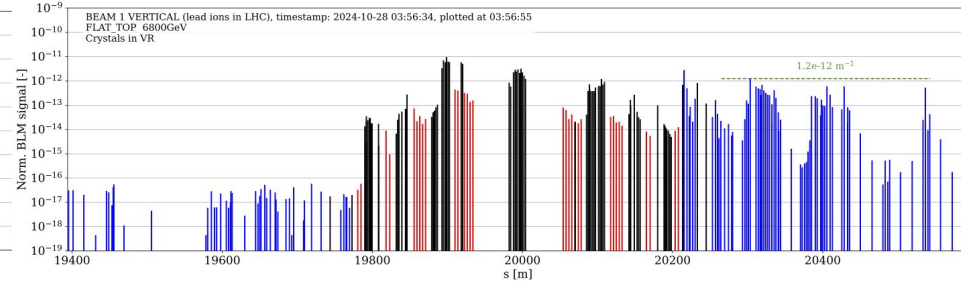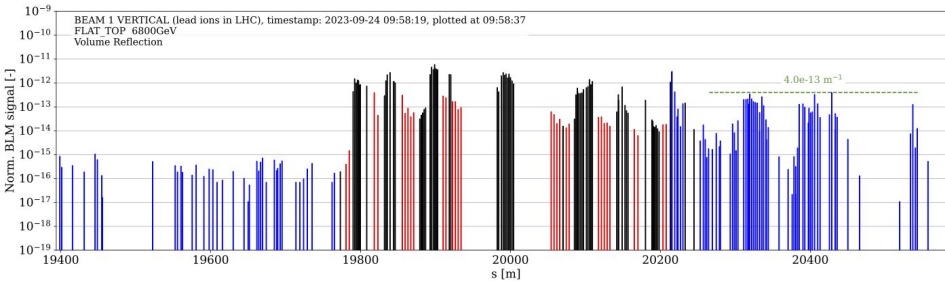
- Worse cleaning in 2024 wrt 2023
- Lower/higher losses in TCT.2/IR3 wrt 2023
  - Difference in TCT.2 expected since TCT.2 settings more open, on_disp knob is ON
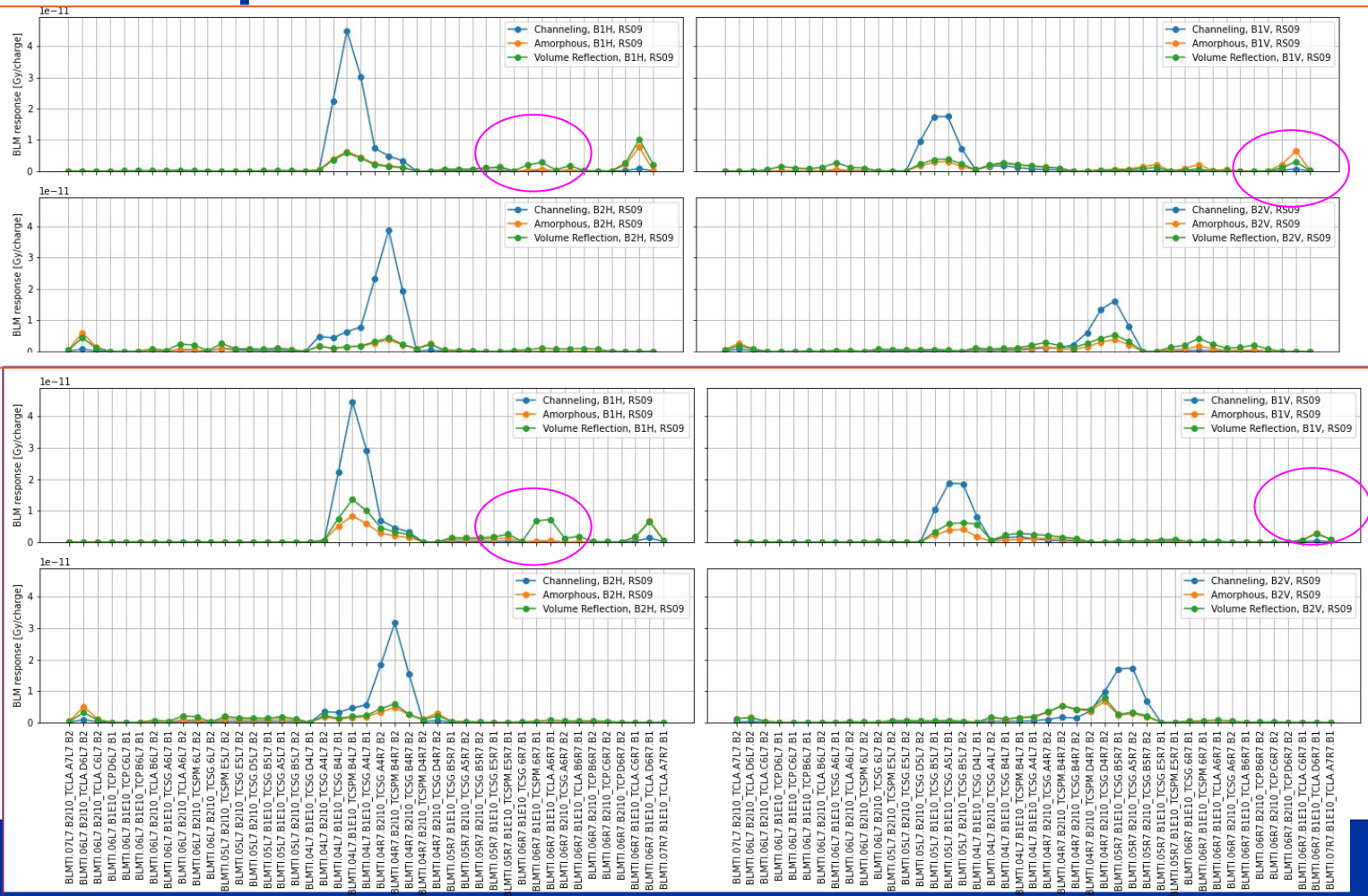
Example 2024 Pb loss maps

Amorphous
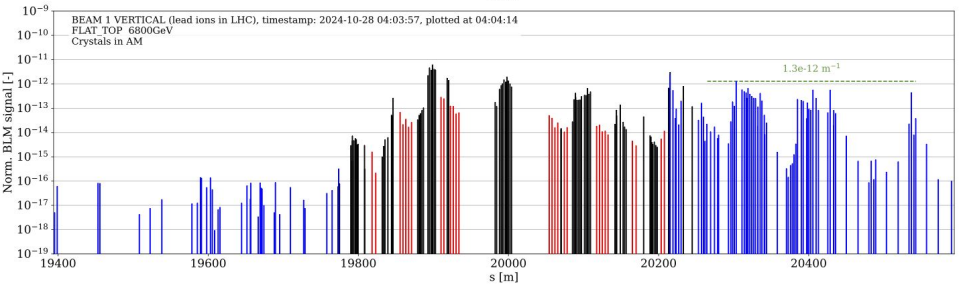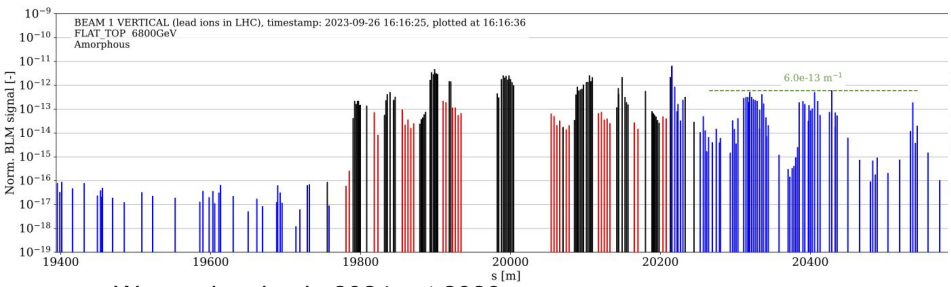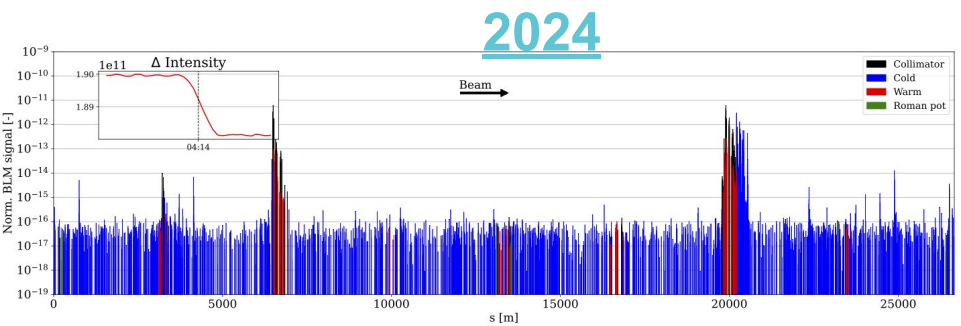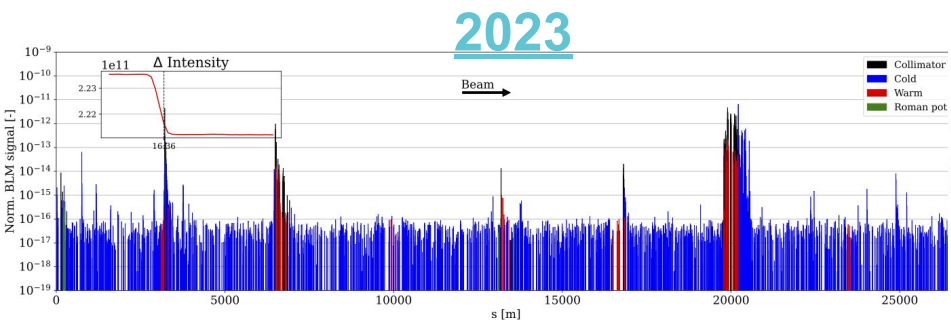
- Worse cleaning in 2024 wrt 2023
- Lower/higher losses in TCT.2/IR3 wrt 2023
- Very similar cleaning for AM, VR in 2024

Cleaning IR7 in 2024
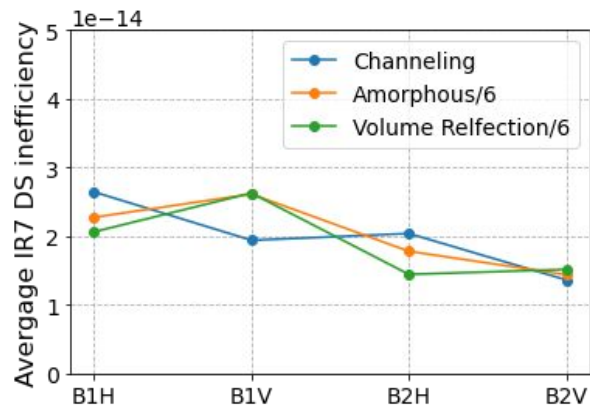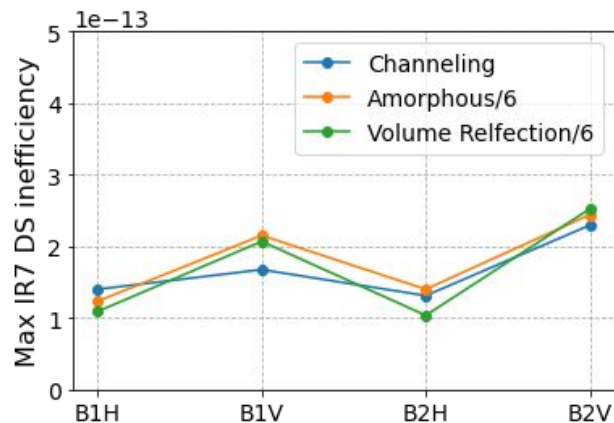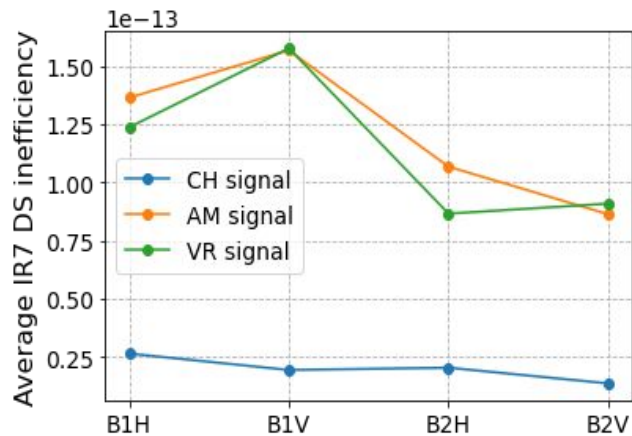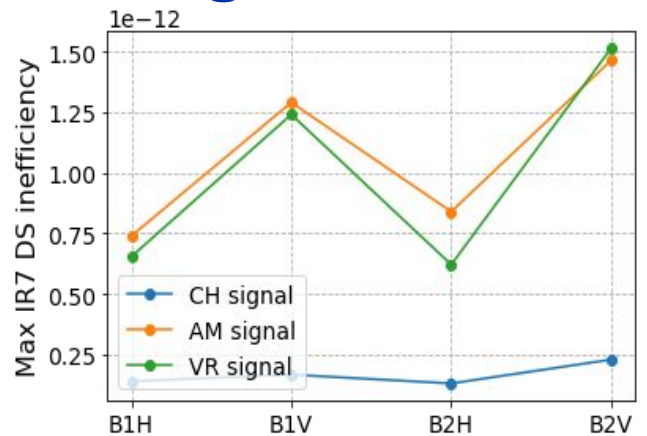
A factor ~6 is needed this year to bring VR, and AM at the same level as CH wrt a factor ~4 in 2023
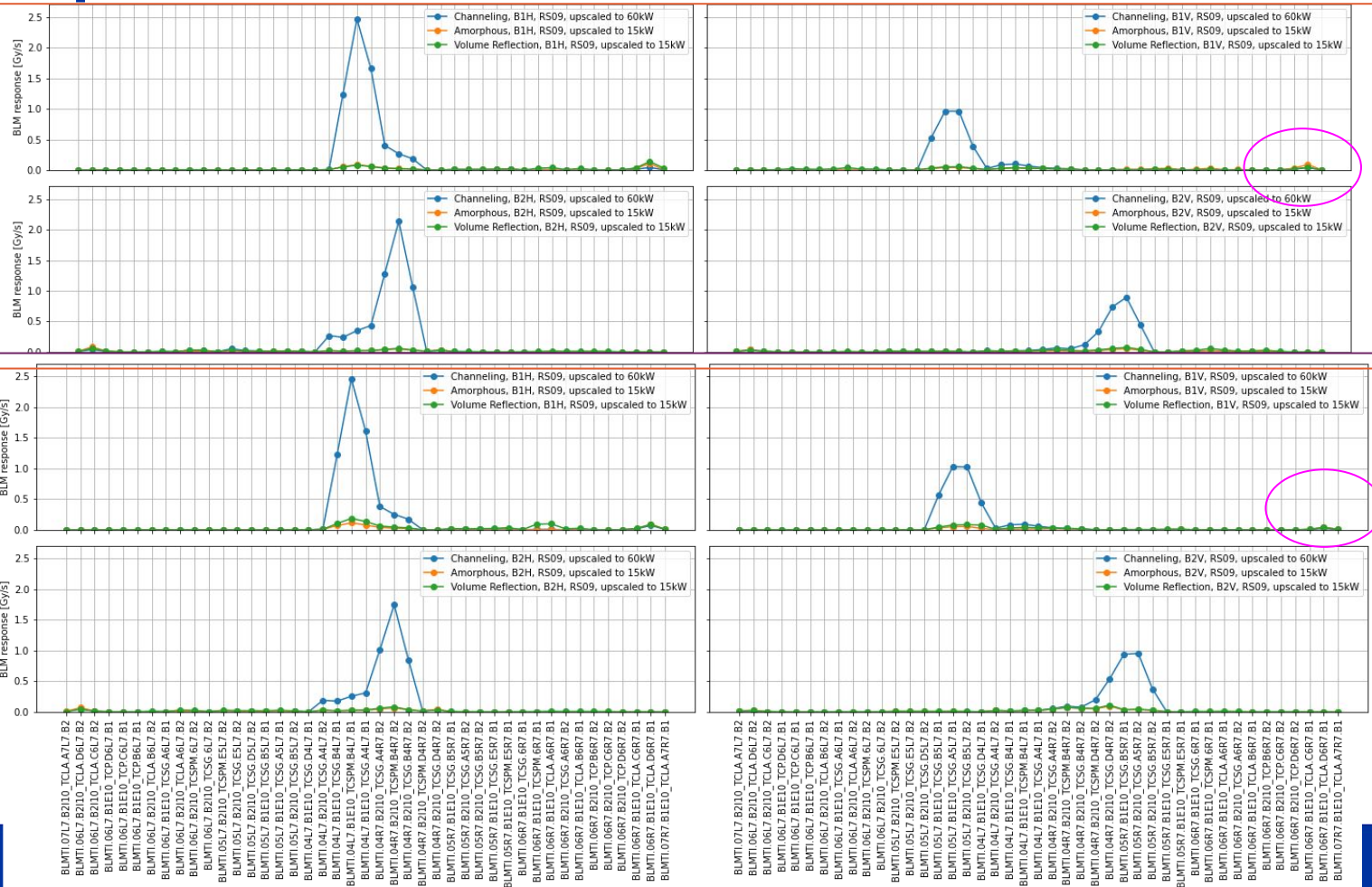
Envelopes for IR7 collimators - RS09
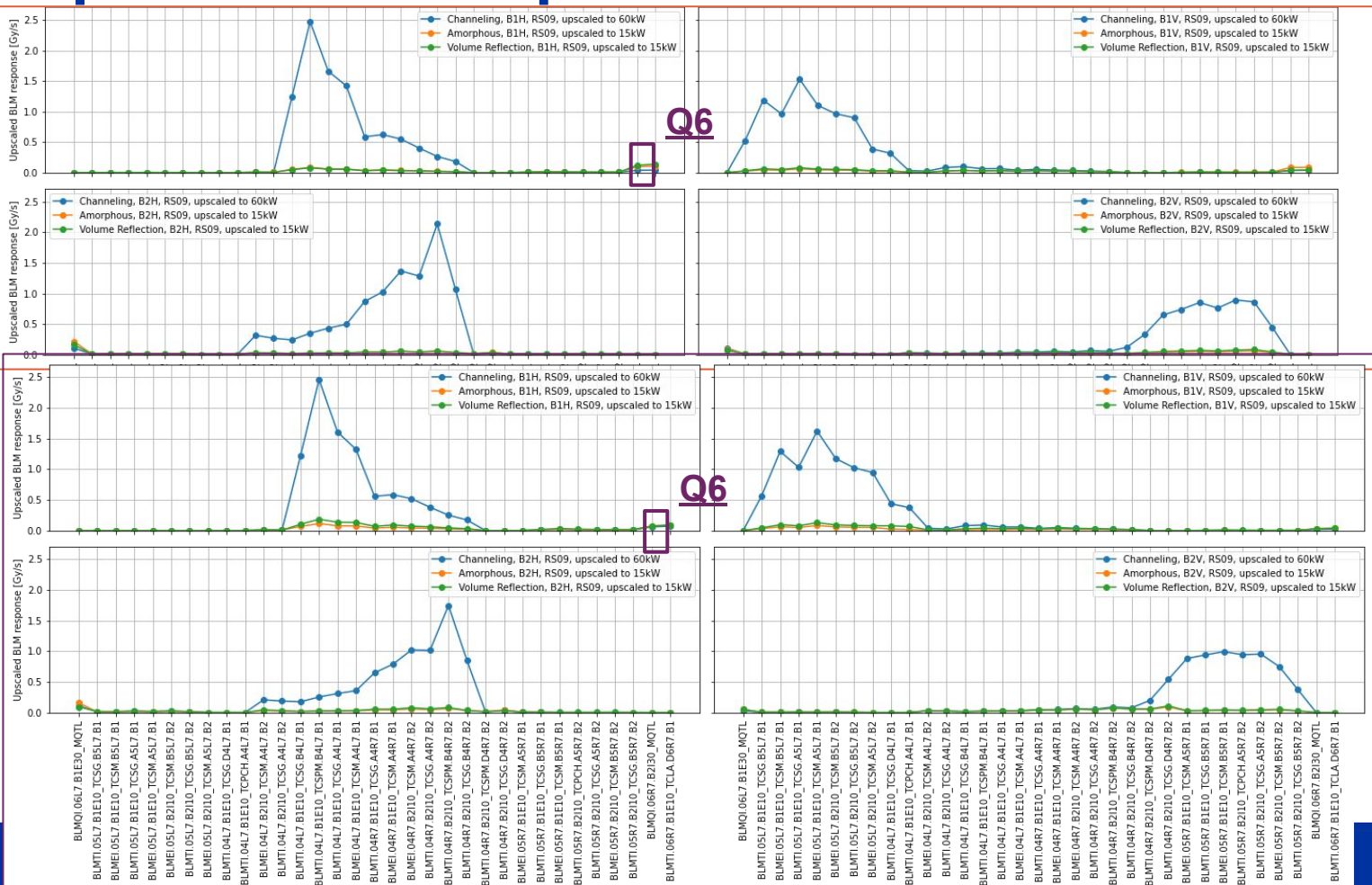
Upscaled for IR7 collimators - RS09

2023

2024

Main differences
- TCSG.6R7 VR '24 > TCSG VR '23
- TCLA.D6R7 VR ~ AM in '24, while AM > VR in '23
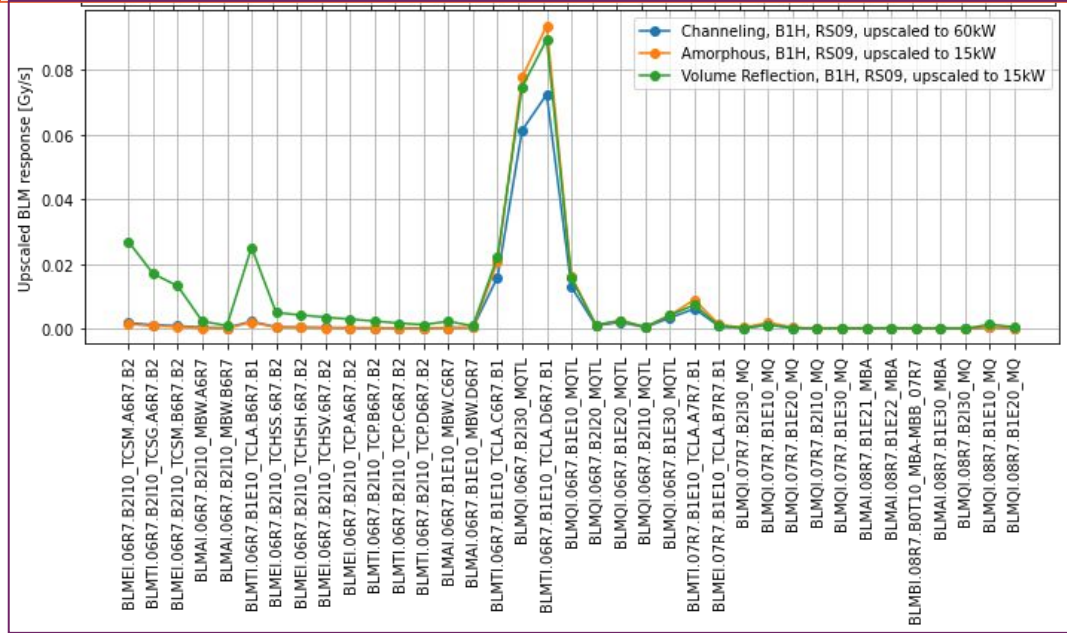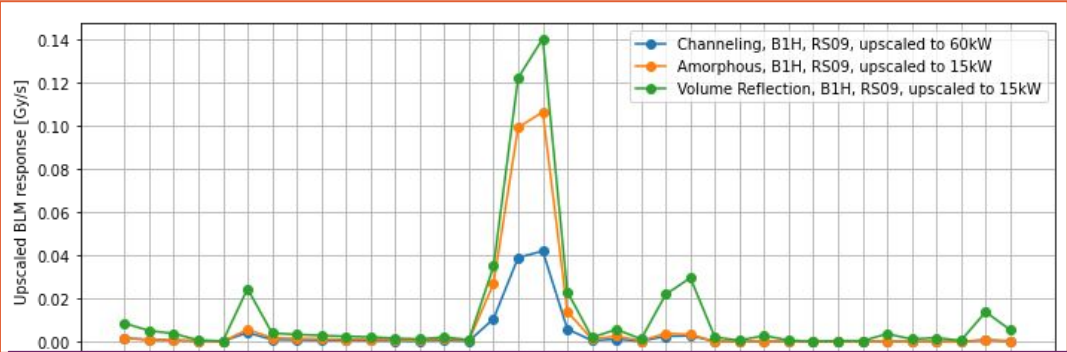
Upscaled envelopes for all interlocked BLMs - RS09

2023

2024

*VR ~ AM in 2024 i/o
VR>AM in 2023*

Upscaled envelopes in the Q6R7 region

2023

2024

2023: VR>AM
2024: VR ~ AM or AM> VR