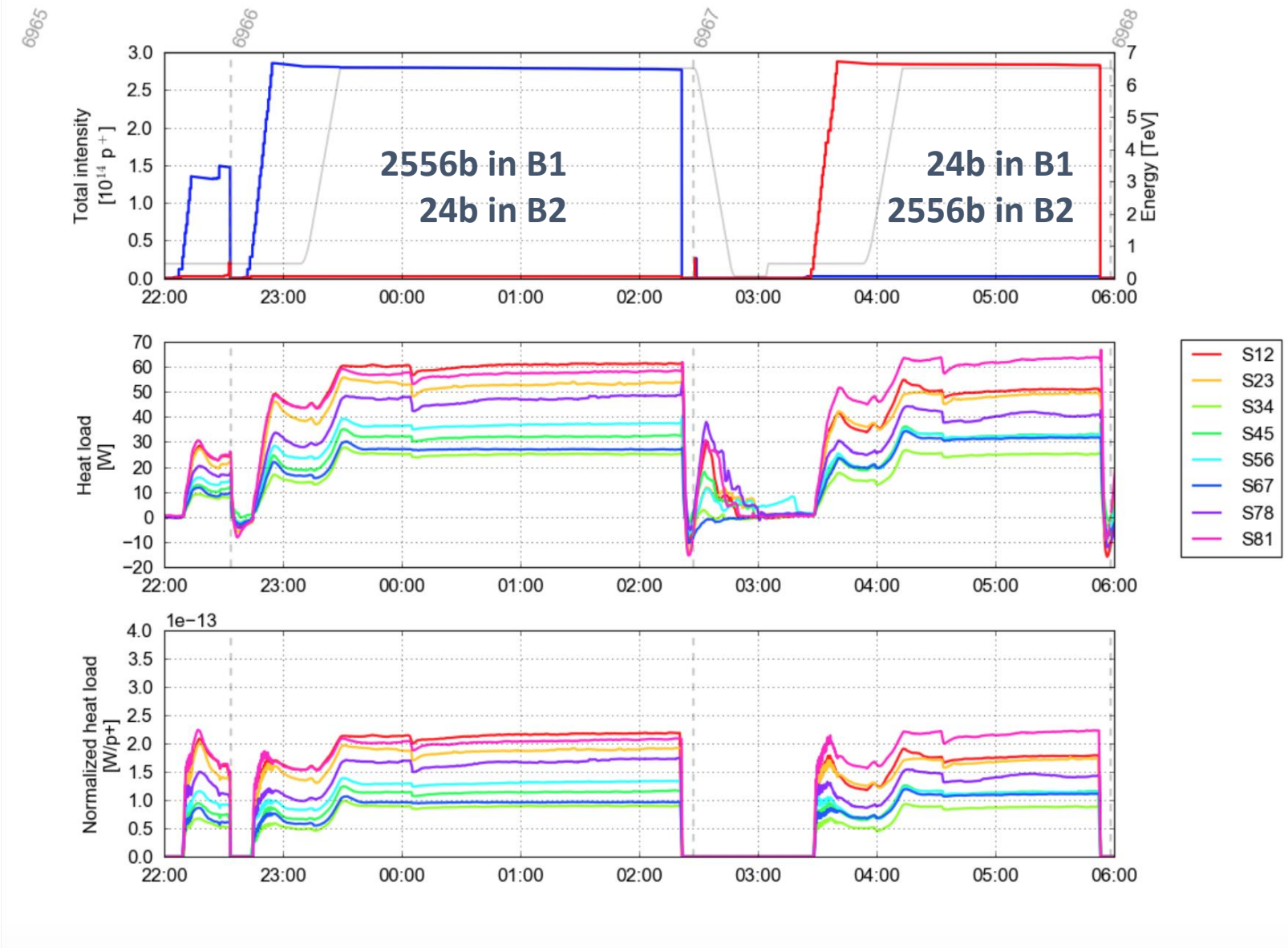
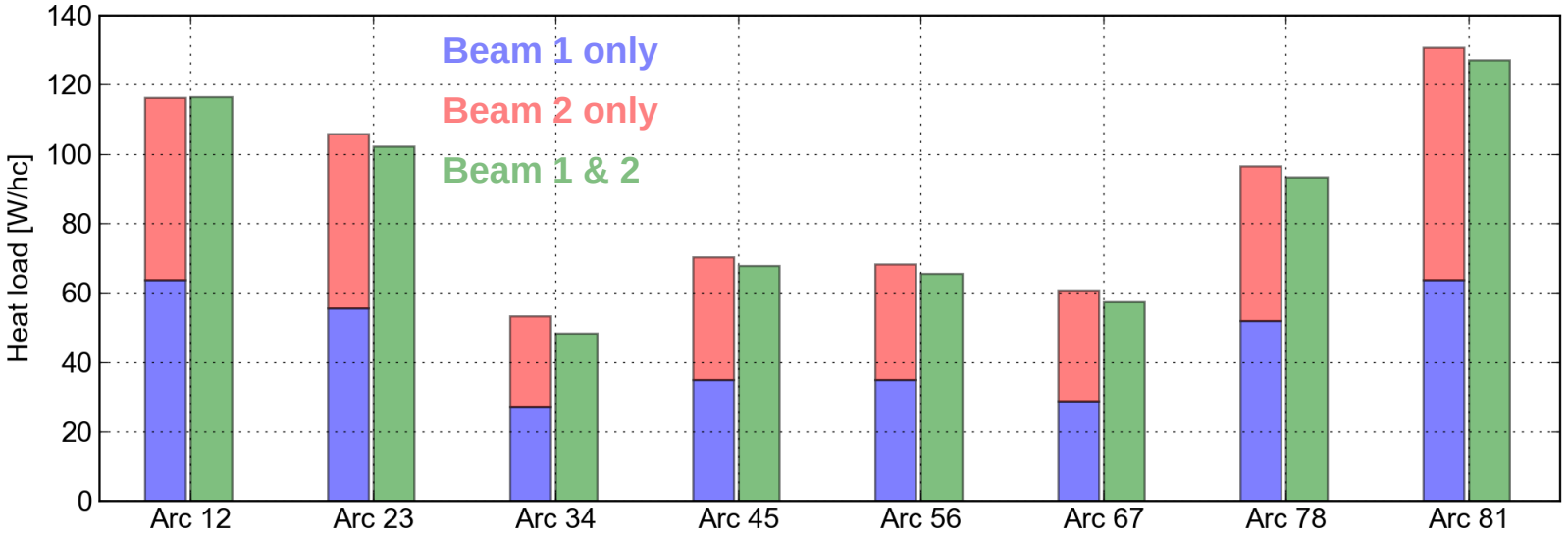
MD3295 Heat load with single circulating beam

- Performed two fills with B1 alone and B2 alone (for heat load characterization)



MD3295 Heat load with single circulating beam

- Observations on arc total:
  - Sum is consistent with measurements with two beams
  - In some high-load arcs contribution of B1 is slightly larger



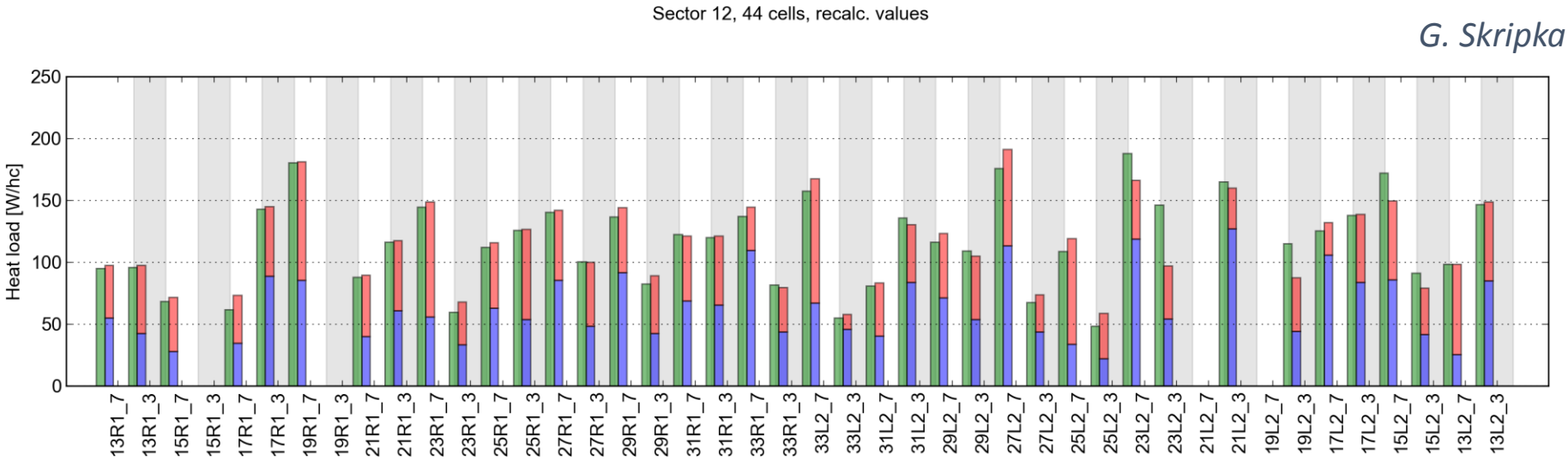
G. Skripka

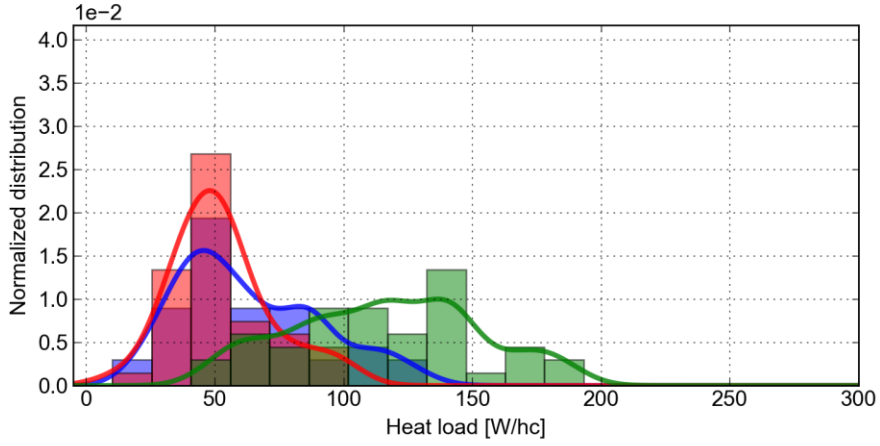
Fill	6966	6967	6961
Started on	23 Jul 2018 22:33	24 Jul 2018 02:27	22 Jul 2018 18:22
T_sample [h]	2.20	2.50	2.00
Energy [GeV]	6499	6499	6499
N_bunches (B1/B2)	2556/24	24/2556	2556/2556
Intensity (B1/B2) [p]	2.79e14/2.40e12	2.41e12/2.84e14	2.79e14/2.83e14
Bun.len. (B1/B2) [ns]	1.07/1.06	1.07/1.11	1.11/1.10
H.L. exp. imped. [W]	4.52	4.47	8.77
H.L. exp. synrad [W]	5.99	6.09	11.96
H.L. exp. imp.+SR [W/p+]	3.73e-14	3.69e-14	3.69e-14
T_nobeam [h]	0.17	0.95	0.50

MD3295 Heat load with single circulating beam

- Observations at cell-by-cell level:
  - Sum is consistent with measurements with two beams
  - In some high-load arcs contribution of B1 is slightly larger

G. Skripka



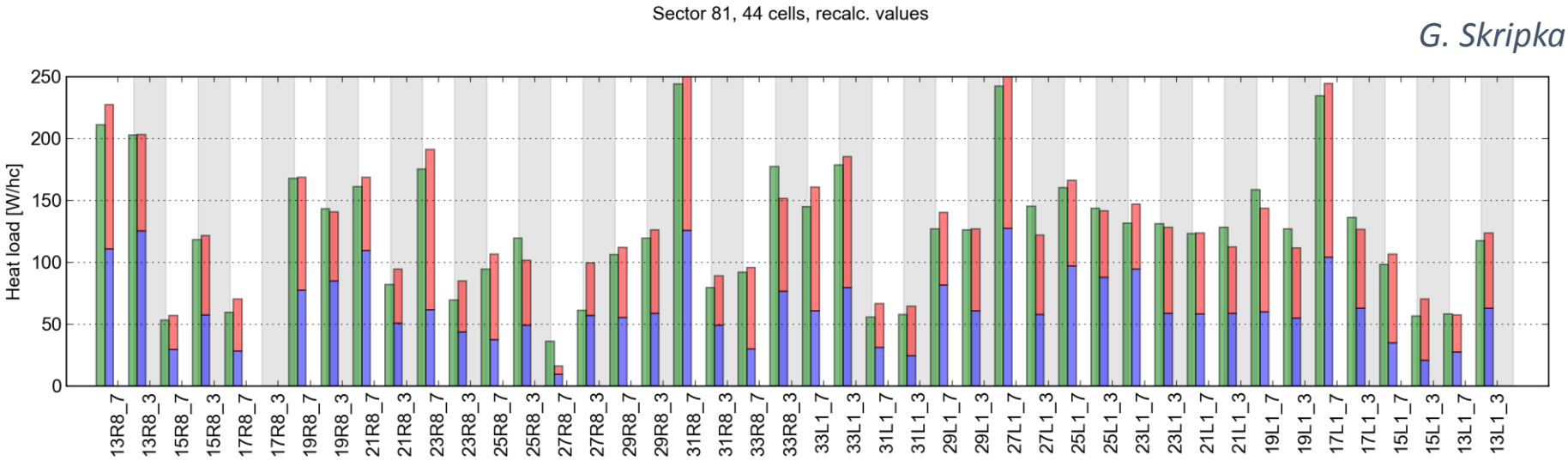


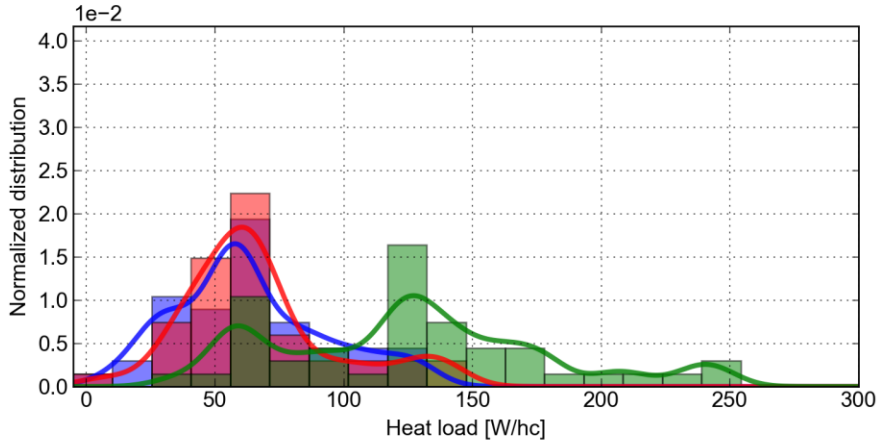
Fill	6966	6967	6961
Started on	23 Jul 2018 22:33	24 Jul 2018 02:27	22 Jul 2018 18:22
T_sample [h]	2.20	2.50	2.00
Energy [GeV]	6499	6499	6499
N_bunches (B1/B2)	2556/24	24/2556	2556/2556
Intensity (B1/B2) [p]	2.79e14/2.40e12	2.41e12/2.84e14	2.79e14/2.83e14
Bun.len. (B1/B2) [ns]	1.07/1.06	1.07/1.11	1.11/1.10
H.L. S12 (avg) [W]	63.70	52.47	116.40
H.L. S12 (std) [W]	27.11	18.71	35.92
H.L. exp. imped. [W]	4.52	4.47	8.77
H.L. exp. synrad [W]	5.99	6.09	11.96
T_nobeam [h]	0.17	0.95	0.50

MD3295 Heat load with single circulating beam

- Observations at cell-by-cell level:
  - Sum is consistent with measurements with two beams
  - In some high-load arcs contribution of B1 is slightly larger

G. Skripka

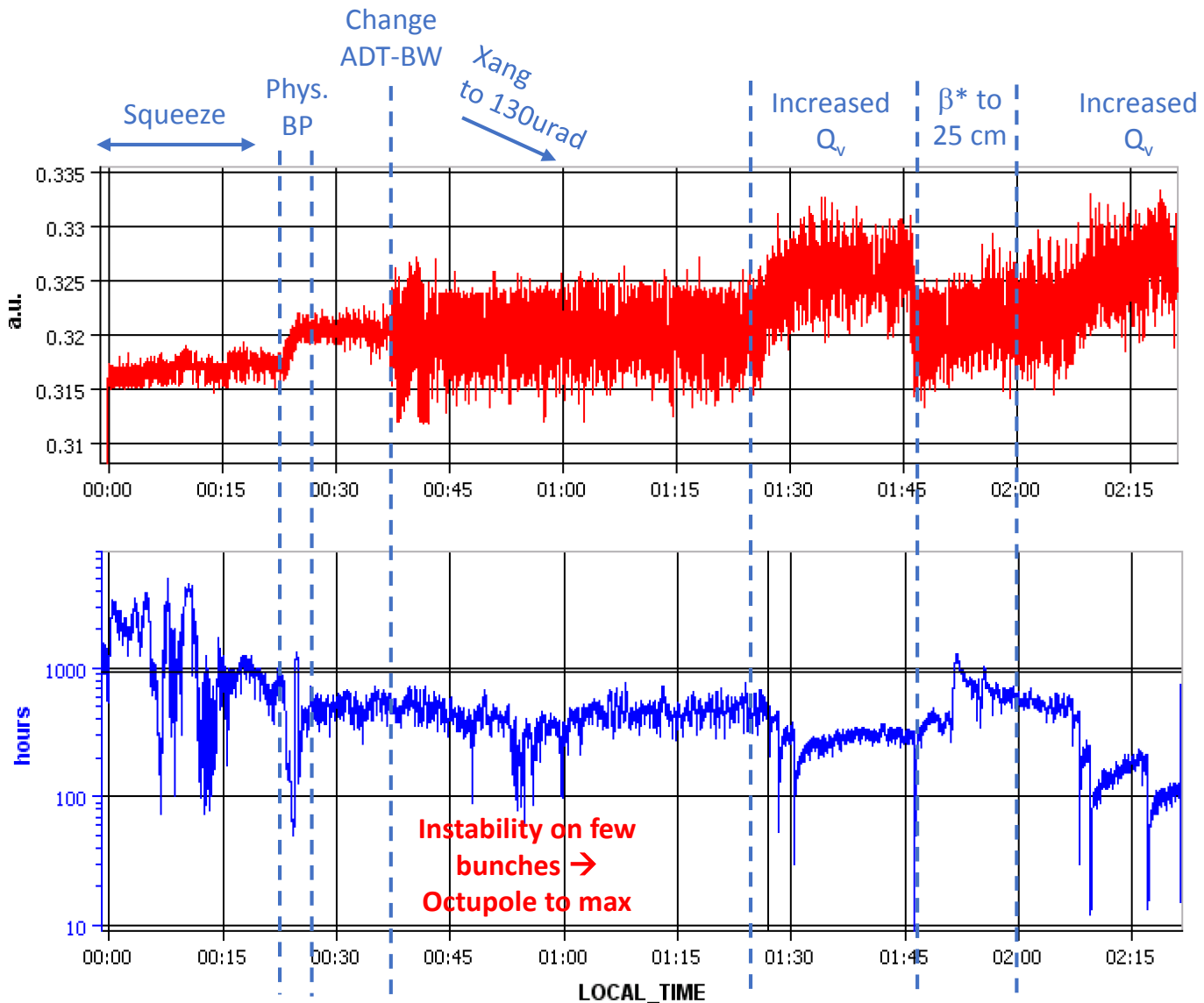




Fill	6966	6967	6961
Started on	23 Jul 2018 22:33	24 Jul 2018 02:27	22 Jul 2018 18:22
T_sample [h]	2.20	2.50	2.00
Energy [GeV]	6499	6499	6499
N_bunches (B1/B2)	2556/24	24/2556	2556/2556
Intensity (B1/B2) [p]	2.79e14/2.40e12	2.41e12/2.84e14	2.79e14/2.83e14
Bun.len. (B1/B2) [ns]	1.07/1.06	1.07/1.11	1.11/1.10
H.L. S81 (avg) [W]	63.78	67.05	127.08
H.L. S81 (std) [W]	29.26	29.57	52.50
H.L. exp. imped. [W]	4.52	4.47	8.77
H.L. exp. synrad [W]	5.99	6.09	11.96
T_nobeam [h]	0.17	0.95	0.50

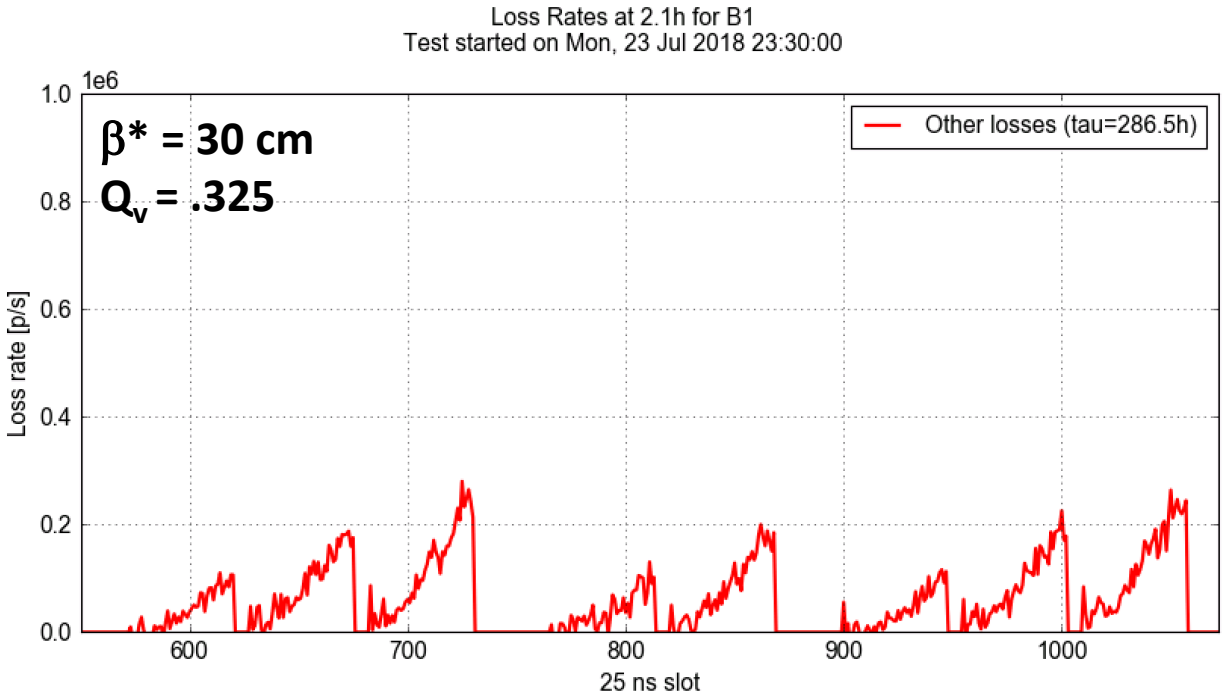
MD3295 Heat load with single circulating beam

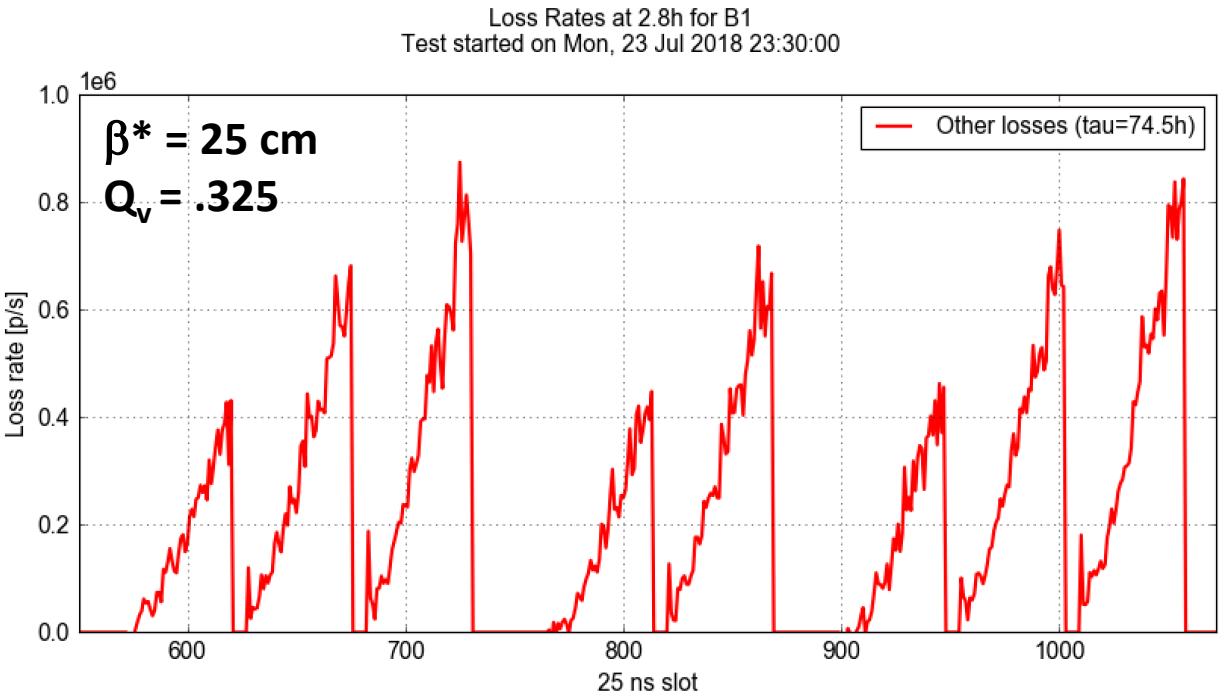
- Lifetime with single beam in very high (flat-top, squeeze, “collisions”)
- Could be degraded by increasing Q_v → e-cloud pattern visible
- Clear effect of β* → Indicated an impact of e-cloud in triplets/ATS-Arcs



2556b in B1, 24b in B2

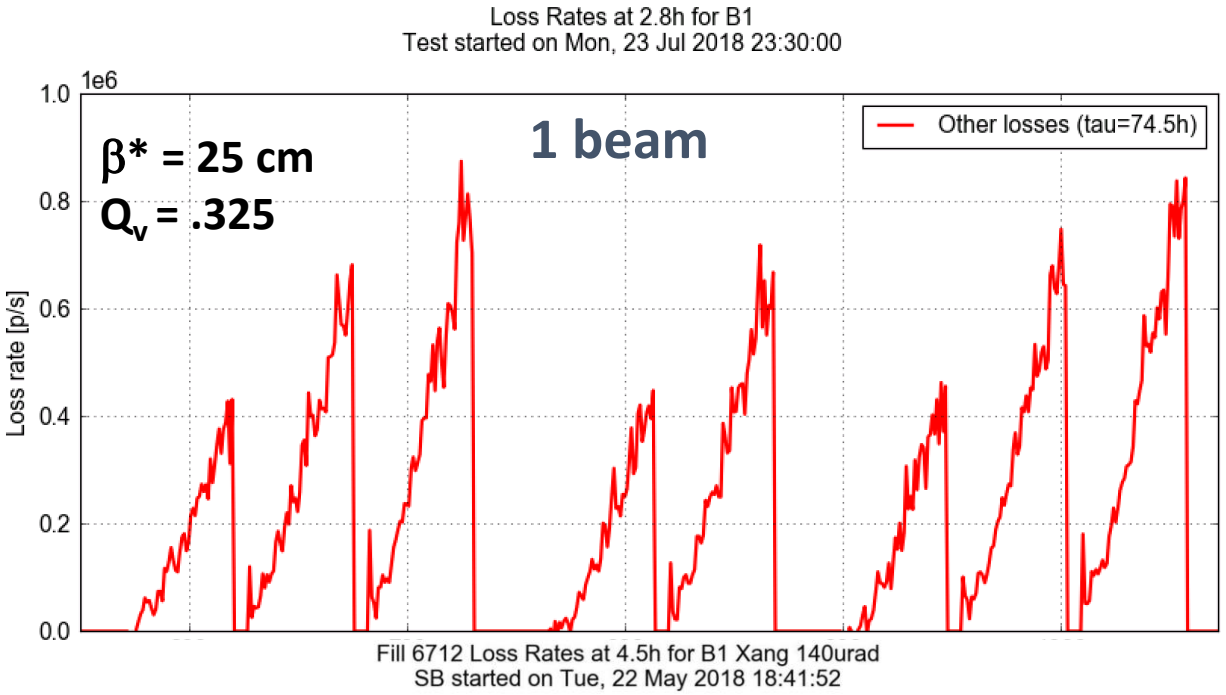
Effect of β*

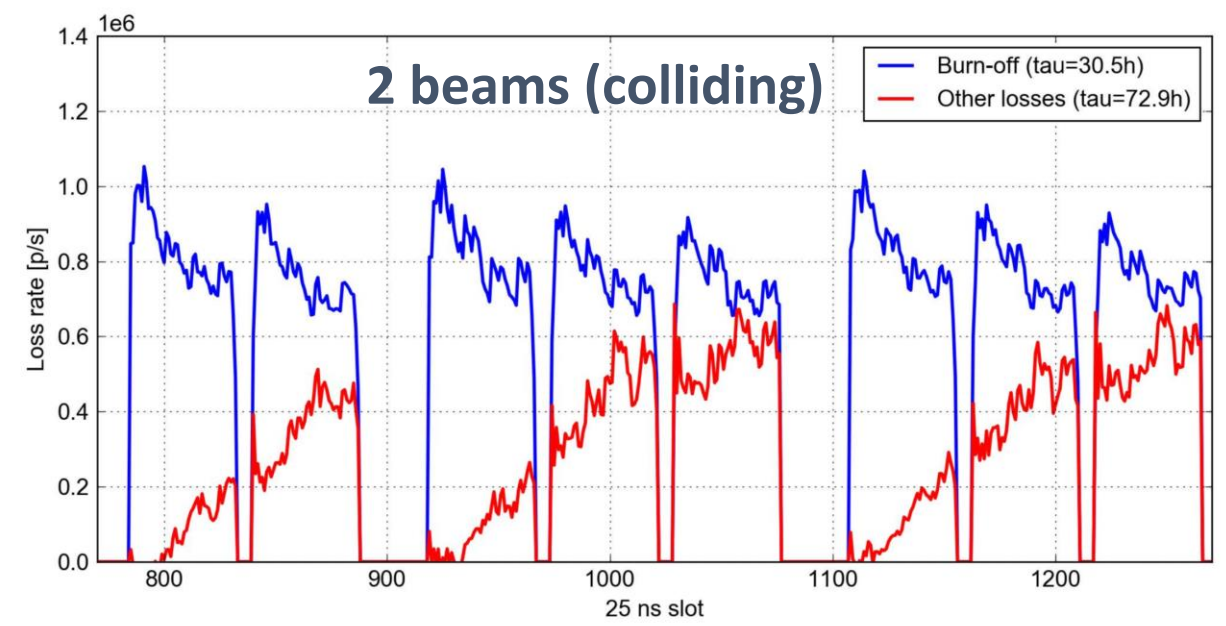

Loss Rates at 2.1h for B1
Test started on Mon, 23 Jul 2018 23:30:00
1e6
β* = 30 cm
Q_v = .325
Other losses (tau=286.5h)
Loss rate [p/s]
25 ns slot


Loss Rates at 2.8h for B1
Test started on Mon, 23 Jul 2018 23:30:00
1e6
β* = 25 cm
Q_v = .325
Other losses (tau=74.5h)
Loss rate [p/s]
25 ns slot

MD3295 Heat load with single circulating beam

Different pattern to compared to physics
→ compatible with e-cloud in the triplets



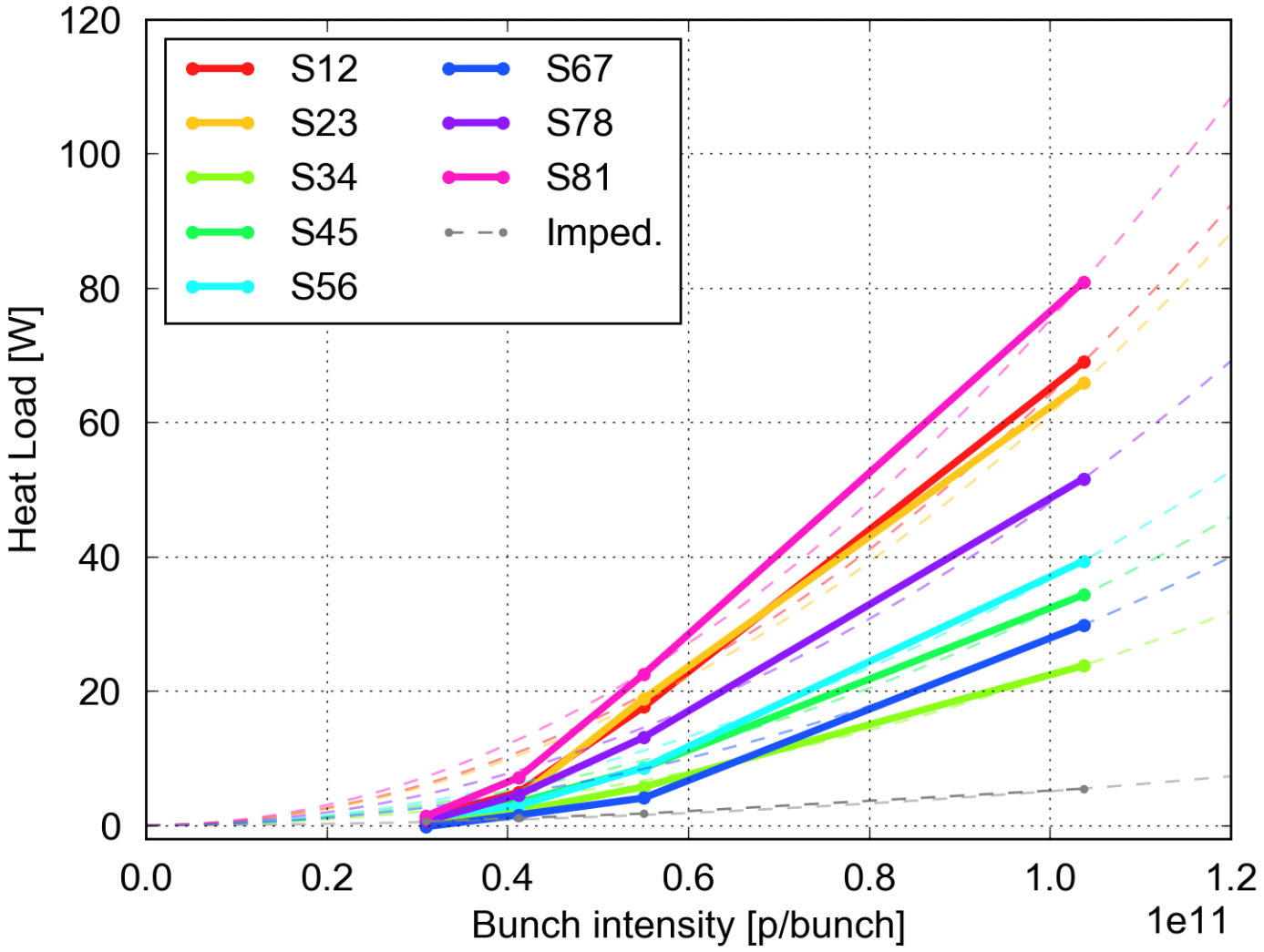


MD3300 Heat load measurements vs bunch intensity

- Measurements were collected with 2556b in both beams having a bunch intensity of **3e10 p/bunch**.
  - The measurement required dedicated ADT settings (prepared in advance by Daniel).
  - As expected, the orbit measurement was quite poor and it was not possible to use the orbit feedback.
  - Filling took quite long due to problems in the injectors (PS RF and interlocked BPMs in the SPS).
- It was not possible to take a further measurement with 8e10 p/bunch within the assigned time slot, due to similar issues in the injectors.

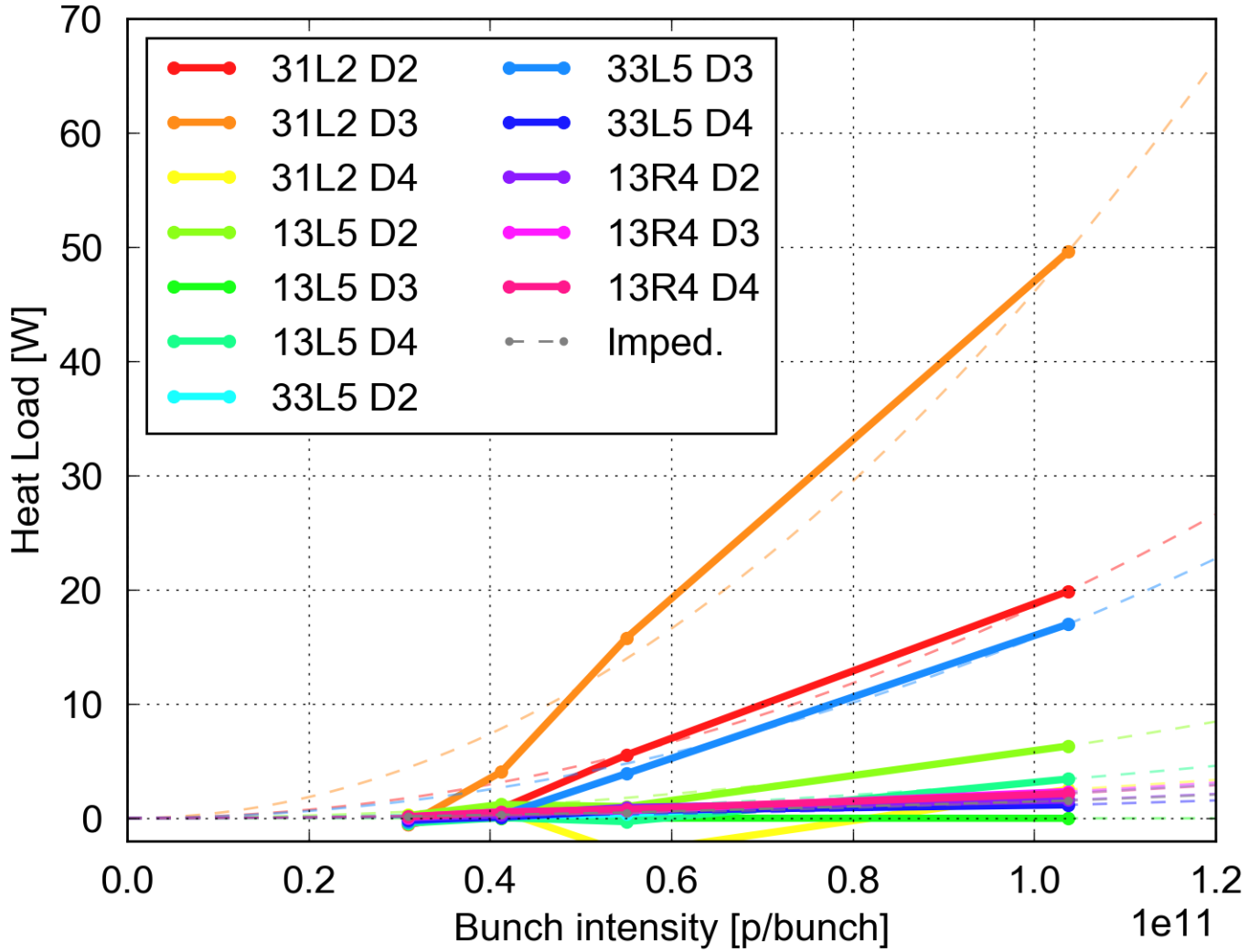
MD3300 Heat load measurements vs bunch intensity

- **Extrapolation from previous measurements is confirmed** --> no measurable heat loads at 3e10 p/bunch



MD3300 Heat load measurements vs bunch intensity

- **Extrapolation from previous measurements is confirmed** --> no measurable heat loads at 3e10 p/bunch



MD3300 Heat load measurements vs bunch intensity

- **Extrapolation from previous measurements is confirmed** --> no measurable heat loads at 3e10 p/bunch