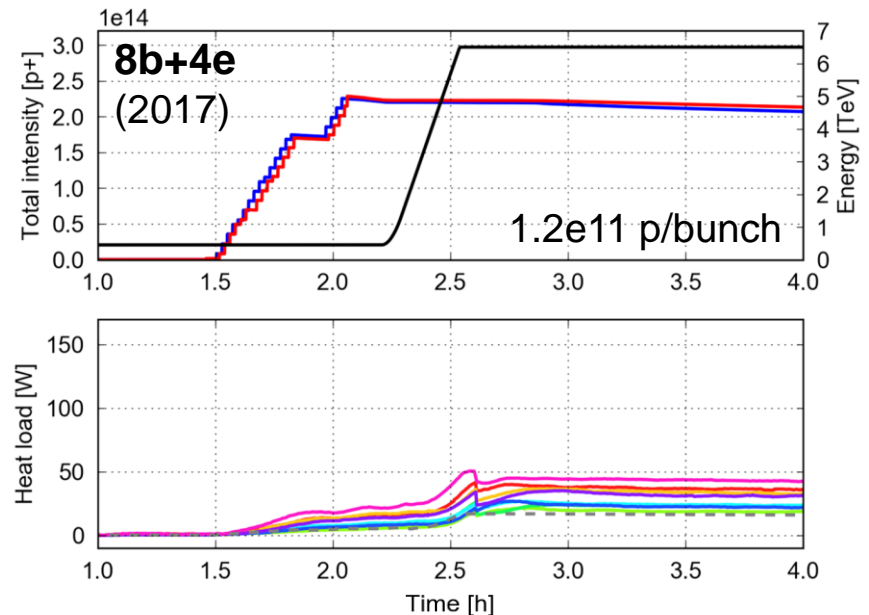
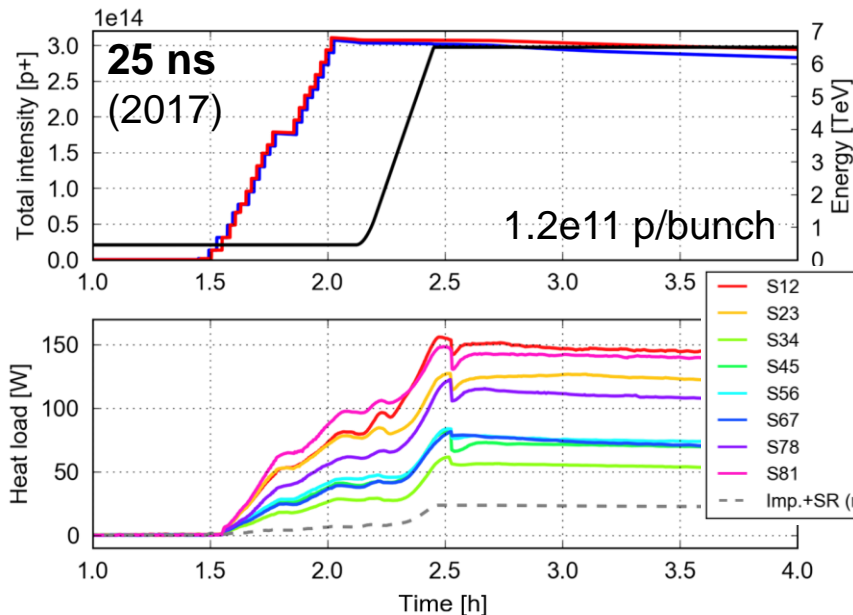




MD2484: Electron cloud with high intensity 8b+4e beams

- Heat load mitigation with the 8b+48 scheme was successfully **tested** in the LHC in **2015** and **used in operation** in the last part of the **2017 Run** (to mitigate fast losses in 16L2)
- The goal of the MD is to **verify that the heat load remains moderate also for larger bunch intensity**
 - Injectors can provide **~1.7 p/bunch** using the 8b+4e scheme
- MD requested already in 2017, not possible due to 16L2 issues
 - Previous experience: two trains of 56b with 1.55 p/bunch 8b+4e ramped in 2017 for LRBB MD (see [LSWG 9Oct2017](#))





- **Option 1:** As an outcome of MD3270, the hypercycle with **large telescopic index in the ramp** (already tested during the MD3 block) should be validated for operation with multiple bunch trains and used for the heat load MD. This will allow testing the ramp with large telescopic factor with full beams.
- **Option 2:** in case MD3270 is unsuccessful, this MD will be performed using the **operational hypercycle**.



MD2484: Electron cloud with high intensity 8b+4e beams

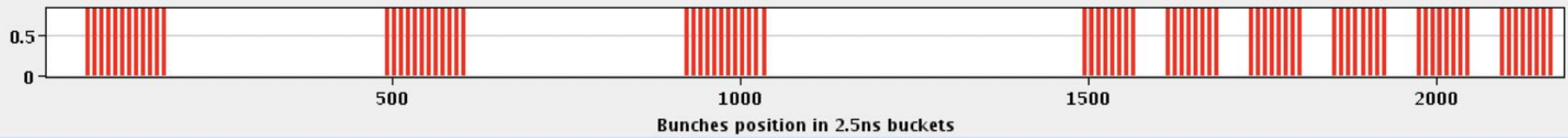
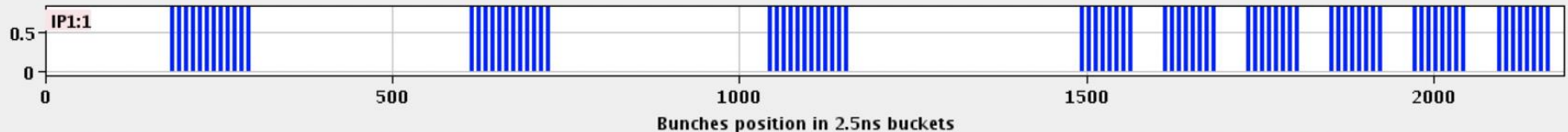
- **Beams to be prepared in the injectors:**
 - **2x48b**, 8b+4e scheme, **1.7e11 p/bunch**
 - Compatible with present MKI pulse length and AGK
- **Main steps of the test:**
 - Fill the machine with 8b+4e beams ($\sim 1.7e11$ p/bunch)
 - Wait for clean heat load measurement
 - Ramp
 - Wait for clean heat load measurement
 - Squeeze (only for option 2)
 - Go to collisions ($\beta^*=65$ cm for option 1, at $\beta^*=30$ cm for option 2)
 - Reduce the crossing angle (120 \rightarrow 80 urad for option 1, 160 \rightarrow 130 urad for option 2)
 - Reduce β^* to 25 cm (only for option 2)
- **Two cycles:**
 - 876 bunches
 - 1812 bunches (required to verify that we have no e-cloud cleaning effect from long gaps)



MD2484: Electron cloud with high intensity 8b+4e beams

- Other requirements:
 - **ADT** settings for high bunch intensity (should be already available)
 - Max **octupoles** at high energy
 - **RF voltage** at injection set to **6 MV** and possibly adjusted **longitudinal blow-up function in the ramp** (if required by RF expert)
 - Adjusted **cryogenic feedforwards**
- UFO studies in parallel:
 - Transverse blow-up to be applied after the injection of 3x12b (non colliding)

RFBucket	Bu Tot	bu/btch	Spc/ns	PSbchs	I level		RFBucket	Bu Tot	bu/btch	Spc/ns	PSbchs	I level
181	12	12	25	1	INTR	▲	61	12	12	25	1	INTR
611	12	12	25	1	INTR		491	12	12	25	1	INTR
1041	12	12	25	1	INTR		921	12	12	25	1	INTR
1491	48	48	25	1	NOM		1491	48	48	25	1	NOM
2481	96	48	25	2	NOM		2481	96	48	25	2	NOM





MD2484: Electron cloud with high intensity 8b+4e beams

- Proposed intensity ramp-up (for the cycle with large telescope in the ramp), from Jan's e-mail:
 - **MD32770 ATS Round**
 - Setting up of collimators, if required, and loss maps: 4h
 - 12 b fill and fly the wire (MD4507): 4h
 - 150 b fill for intensity ramp-up: 4 h
 - **MD2484 8b4e heat load and MD3246 UFO**
 - 876 bunch fill: 6 h
 - 1836 bunch fill: 6 h
- The UFO-team would like to have a test at the end of the fill
 - Blow-up more bunches (hundreds)
 - Switch off the solenoid in 16L2
 - Wait for 16L2 event

Are these cycles both needed for machine protection?