WP2 Actions – part I

Nicolas Mounet and Rogelio Tomás, for WP2 – ***many thanks to Elias Métral!***

Task leaders:
2.1 R. De Maria
2.2 M. Giovannozzi
2.3. G. Sterbini
2.4 X. Buffat
2.5. L. Mether
2.6. R. Bruce

WP contacts:
WP3 E. Todesco
WP4 R. Calaga
WP5 S. Redaelli
WP10 F. Cerutti
WP13 T. Lefevre
WGA R. De Maria, M. Giovannozzi

Contacts with LIU / injectors: H. Bartosik, G. Rumolo

WP2 actions – organisation

- Currently, actions are added to a table after each meeting (here):

	DATE	MEETING	PEOPLE HAVING THE ACTION	ATUS OF THE ACTION (if done, wher	
7	25/07/2023	216th HiLumi WP2 Meeting	Rogelio	Done	Contact WP3 to ask for MCBXF fiel
8			Hannes		Plan bunch-by-bunch reproducibility
9	04/07/2023	Special joint HiLumi WP2/WP4/WP13 Meeting			
10					
11					
12					
13	27/06/2023	Special Joint HiLumi WP2/WP5 Meeting	Stefano		Look into what happened with the T
14			Impedance team & Wil		Measure and report back on the eff
15			Nicolas, Xavier, Stefano & impedance/collimation team		Design one or several scenarios ma
16	20/06/2023	215th HiLumi WP2 meeting	Lorenzo and Nicolas		Check octupole threshold in the cor
17			Guido and Colas		Check for DA in the configuration of
18			Lorenzo		Present octupole thresholds illustrat
19			Riccardo		Prepare a plan for MDs with flat opt
20			Lorenzo and Nicolas		Study octupole threshold without C(
21			Lotta et al		(If comb filter needed, see above ro
22			Lorenzo and Nicolas		(If single-bunch tune shifts are stror

- Advantages:
  - Easy to fill after each meeting, easy to update
  - One single place to keep track of all the actions
- Drawbacks:
  - No link between actions, no classification (except by meeting),
  - Not sorted by relevance / priority
  - Painful to review and to check the status…

WP2 actions – organisation

- Proposal:
  - **Group actions by task** / **WP** / **others** (e.g. link with injectors, etc.) and maybe **prioritize** (short / middle / long term).
  - Choose the right group from the person responsible for the action (first name given).
  - Do such a classification immediately after the meeting.
  - Still keep the info about the meeting in which the action was decided.
  - All this to be done directly in the new WP2 website.

$\Longrightarrow$ Easier to review and to keep up to date.

- First attempt to group the actions in the following – focusing on WP3 reporting and tasks 2.1 to 2.3 (see next meeting for other tasks and WPs).

Actions from WP3 (E. Todesco)

- **Impact of the beam screen on beam quality (Δb3=1 unit in D2)**, including **specific tests to address its effect in a dipolar field –** meetings 09/03/2021, 19/04/2021 and 15/03/2022

  ⟹ **Ongoing** - will be checked with Suzana, possibly with a proposal for a revision of the acceptance (to have an asymmetric range on b3).

- **Reporting of the D1 and D2 field quality (including of b3/b5, measurements, in particular with the iron yoke)** – meetings on 19/04/2021, 15/03/2021 and 27/07/2021

  ⟹ **Done** – see Ezio's talk this meeting

- **Report on updates on the MCBXF 2D model** – meeting on 02/05/2023 (Lucio)

  ⟹ **Almost done** – model is completed, presented on 12/07/2023 at WP3 – another WP3 meeting will be in September, then Ezio could report to WP2 (October).

- Two other (old) actions:
  - **Make a proposal for the measurements of cross talks to be carried out for the CP magnets (including priorities) with input from WP2** (01/06/2021).
  - **Re-discuss solution for the MCBXF field quality once the new 2D measurements are available. Two options exist constraining operational space either to a rectangle or to a cross in the H/V powering plane** (07/09/2021).

Actions linked to WGA (R. De Maria, M. Giovannozzi)

- A few actions regarding **alignment** after WP2/WP5 meeting on 07/03/2023:
  - **Organize a dedicated discussion on magnet (re)alignment strategies**
  - **Circulate the functional specification documents as soon as ready and in parallel agree on the alignment references for 2-in-1 devices**

  ⟹ For both: discussion(s) followed up by WGA.

  - With F.X. Nuiry, **Trigger a discussion at the AWG (WGA) aspects related to collimator alignment precedure for the 2-beam devices**

  ⟹ In progress. Will be discussed at the WGA.

Task 2.1: optics & layout (R. De Maria)

- **Provide the numerical table for the β* levelling, and investigate potential solutions to smooth the transport functions for Roman Pots** – meeting 4/03/2022

  ⟹ **Ongoing** - This will be clarified after we decide on the new baseline, in particular for β* of collapse and start of levelling.

- **Provide complete flat optics scenario for studies of collision debris with TCLM4 mask** – WP2/WP5/WP10 meeting 11/10/2022

  ⟹ **Done** – see talk next week by Francesco.

- **Contact Daniel for optimal CC-TCP phase advance** – WP2/WP5 meeting 28/02/2023

  ⟹ **Done**, we stay with 0 deg, pending further studies from his side on the robustness of the choice.

- **Check the consistency between TCL/TCT specification documents and vacuum layout document** – WP2/WP5 meeting on 07/03/2023

  ⟹ **Done**, now waiting the LDB to be completely filled for another round of checks

Task 2.1: optics & layout (R. De Maria)

- Actions regarding **flat optics:**
  - 02/05/2023: "**Provide new flat top optics with β* 1/2m** – 02/05/2023

    ⟹ **Done**
  - Prepare a plan for MDs with flat optics in IP8 – 20/06/2023

    ⟹ **Ongoing,** expected during Fall.
  - Contact collimation colleagues to proceed with new IR7 optics – 20/06/2023

    ⟹ **Ongoing**, we will have a new IR7 in the future baseline, more details on Sept. 5th meeting.

Task 2.2: single-particle DA (M. Giovannozzi)

- **Define strategies and add new scenarios (as smaller magnet pool for TF sorting) for magnet sorting depending on the timeline and available information** – WP2/WP5 meeting on 07/03/2023:

  ⟹ Probably **ongoing**, to be checked with Andreas.

- Two actions for Thomas after the meeting on 04/04/2023:

  - **Carry out DA simulations without a4 and a6 correctors to assess the impact of these components on DA and the benefit of the correctors**
  - **Check the strength of correctors in previous DA simulations and with older HL-LHC layouts.**

  ⟹ Both **Done** after Thomas' talk at the WP2 on July 25th.

Task 2.3: Incoherent effects (G. Sterbini)

- **Check if anything further can be learned about the relationship between lifetime and DA for ions through the fits by Massimo Giovannozzi. Check if 2011 MD or 2018 operation, where the crossing passed through zero, could be used to correlate simulated DA with lifetime. Verify whether corrections to the errors are included in the simulations** – meeting on 28/09/2021:

  ⟹ still **ongoing**, long-term action.

- **Review IBS simulations at injection** – meeting 18/01/2022

  ⟹ still **ongoing**, status to be checked.

- **Find out how to proceed for the studies of the wire EM field with the perturbation from the brazing material** – meeting 22/02/2022

⟹ considered **done** (talk at Uppsala) – one can investigate further but only if there will be a project and technical design (here it's a proof of principle).

Task 2.3: Incoherent effects (G. Sterbini)

- **Estimate the expected variation of transfer matrix elements for Roman Pots as a result of beam-beam interactions and other effects** – 4/3/2023

  ⟹ **Ongoing**. Consolidation is done, specific computation is not.

- **Explore the impact on DA from coupling in the strong beam** – 16/09/2022

  ⟹ **Ongoing** (long-term).

- **Rerun DA simulation studies for nominal filling scheme** – 7/03/2023

  ⟹ Considered **done** after Colas' talk on June 20th (slide 10 – the worst bunch of the mixed scheme is equivalent in terms of beam-beam to the BCMS)

- **Verify what is the ideal filling scheme for 2200 bunches in terms of granularity, as input for beam-beam simulations of a hybrid scheme** – 7/03/2023

  ⟹ **Done** – same talk as above – filling scheme from Lotta.

Task 2.3: Incoherent effects (G. Sterbini)

- **To explore DA versus intensity at the start of physics and at the end of levelling** – 17/01/2023

  ⟹ **Ongoing** – one should first fix the optics at the collapse (round/flat).

- **Check dynamic aperture with β* 0.5/1m and β* 1/2m (SoL), 2.3e11, Q'=15 and the hybrid scheme** – 2/05/2022

  ⟹ **Ongoing – β* 0.5/1 m done**, but not 1/2 m (see Colas' talk on 20/06).

- A few recent actions after the last talk by Colas on 20/06/2023:
  - **Compute DA at SoL with new optics with β*=0.5/2m, with 2.3x10^{11} ppb, scanning MO, keeping Q'=15, and eventually use new optics with new IR7 optics**
  - **Check for DA in the configuration of the 1st year of Run 4 SoL, 1.8x10^{11} ppb, β*= 30cm (round) or flat (tbc), and octupoles at 500 Amps, and scanning Q' up to 20**

  ⟹ both still **outstanding & ongoing** (for the 1st one, closest optics is 0.3/1.2 – probably 0.5/2 will not lead to 140 pile-up).