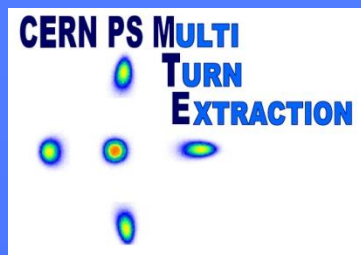


Conclusions from the MTE workshop

M. Giovannozzi

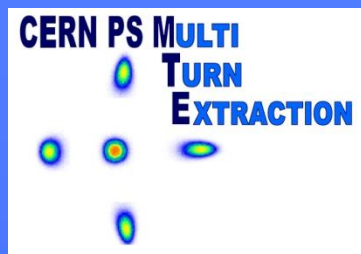
- Status of commissioning with beam -> SG
- Measurements' analysis -> AL
- Status of instrumentation -> SBP
- Mitigation measures for extraction losses -> MG
- Impact of MTE on PS septa -> JB
- Kicker options for MTE -> LD
- Electronics issues for MTE -> EC

Acknowledgements: Roland, speakers, participants



Experimental activities - I

- **Beam measurements: trajectory stability used as figure-of-merit (better resolution than measurements on split beams)**
- **Reproducibility**
 - **Composition of super-cycle matters**
 - **Fluctuations within the same cycle are not negligible**
 - **Magnetic measurements confirm different hysteresis for different cycles (effect on main field and quadrupolar component – **nothing is known for higher-order magnetic multipoles**).**



Experimental activities - II

● Actions:

● Beam measurements:

● simplify even further the machine configuration:

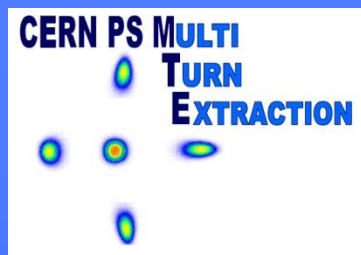
- Use three-current mode for PFW and F8L to create islands
- Test at 2 GeV (machine is more linear and PFW and F8L may not be used)

● Check hysteresis effects

- Use a 26 GeV/c cycle before MTE user during fluctuation measurements
- Cycle F8L on MTE cycle.

● Magnetic measurements:

- Install devices in reference magnet capable of measuring magnetic multipoles.
- First tests might be possible already before the end of 2011 (prototype installation).



Experimental activities - III

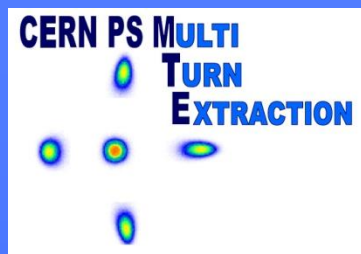
● Instrumentation:

● Orbit system:

- Difficult situation for the first part of the year. It is fixed now.
- The current status is fine for our measurements.

● Other instruments:

- In general the situation seems satisfactory (but we discover issues when the devices are **used...we might need additional support**).
- Clarification required for BLMs to be installed in extraction region.
- Priorities should be discussed.

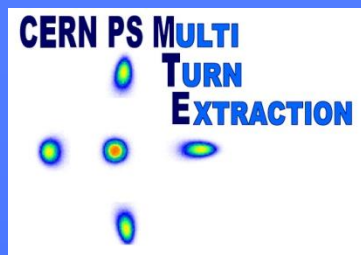


Mitigation measures - I

● Dummy septum:

● Progress on the details:

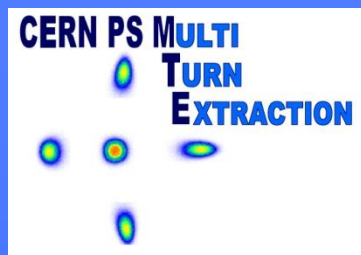
- Extraction trajectories (TOF should be optimised).
 - Relocation of elements currently in SS15 studied: it is proposed to perform tests with additional elements in proposed locations in 2012 to validate choices. Details already checked and proposal is feasible.
 - Overall it seems feasible to find room in the transverse space to accommodate the blade between the extraction trajectories of the various beams.
 - Construction seems technically feasible (decision needed by the end of 2011) for LS1.
 - A spare will be built too.
- Impact on extra shielding to be checked.



Mitigation measures - II

● **Actions:**

- **Finish the analysis (on paper).**
- **Measure trajectories to compare with assumptions.**
- **Optimise TOF.**
- **Document and take final decision.**



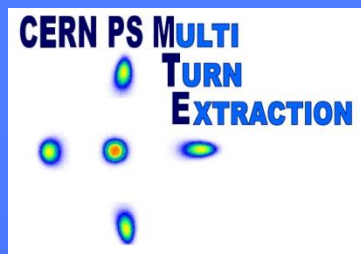
Mitigation measures - III

● Faster kicker rise time:

- Too much (efforts, money, manpower) for not much (reduction of losses -> activation) -> It is proposed to drop this option

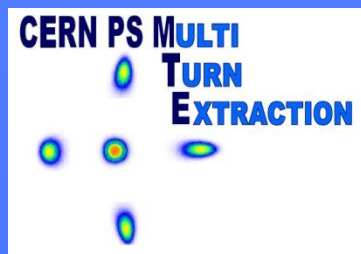
● Stronger kickers:

- Not feasible.
- Already now we are running with 6% safety margin (10% suggested).



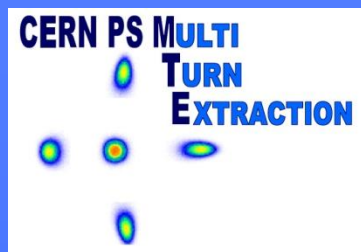
Mitigation measures - IV

- **Hybrid MTE (i.e., use at least of SEH31):**
 - **Progress on the details (beam dynamics):**
 - It becomes a CT-like extraction in terms of PS optics (QKEs mandatory, probably staircase).
 - A scheme was studied and seems promising.
 - **Actions:**
 - Aperture checks
 - Improve closure of fast bump
 - Trajectories of fifth turn
 - Attempt to measurement in PS (**dedicated MD time might be needed**)



Mitigation measures - V

- **Hybrid MTE (i.e., use at least of SEH31):**
 - **Three options at hand (hardware):**
 - **CT only after LS1**
 - Refurbishment required (e.g., electronics)
 - **MTE only after LS1**
 - Consolidation required (already in the planning)
 - **Hybrid MTE after LS1**
 - This allows cohabitation of CT and MTE after LS1.
 - **A decision is needed before end of 2011.**
 - **Hybrid MTE is the most flexible option:**
 - It allows cohabitation of CT and MTE until the issues on MTE are solved.
 - It provides in any case a way to reduce extraction losses

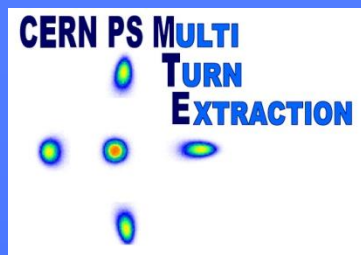


Mitigation measures - VI

Resources (P+M) for hardware activities (TE/ABT)

Scenario	Kickers		Septa		Controls		Total		Comment
	kCHF	FTE	kCHF	FTE	kCHF	FTE	kCHF	FTE	
CT only	240	2.0	390	1.0	475	4.5	1105	7.5	
MTE only	110	1.1	365	0.6	325	3.1	800	4.8	Some infrastructure upgrades are mandatory in B359
Hybrid MTE	260	2.3	390	1.0	525	5.0	1175	8.3	
Dummy septum			250	1.0	50	0.4	300	1.4	LS1, controls FTE not available

NB: “MTE only” is the baseline. Resources should be compared against this option.



Recommendations

- Approve dummy septum (final confirmation by the end of 2011)
- Approve hybrid MTE (final confirmation by the end of 2011)
- Drop faster kicker rise time