EUROnu Super-Beam work package: status-goals

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Irfu-Saclay

Euroν WP2 18/11/2009

Activities

- We held two face to face meetings and three phone meetings
- Plus several informal meetings (NUFACT, MEMPHYS-LAGUNA, Saclay-Strasbourg ...)
- We started to work on all components of the problem:
  - The beam simulations
  - The target
  - The collector
  - Beam-Target interface and requirements
- Two internal notes
- Outreach :
  - Two talks at NUFACT
  - Talk + poster at the CERN workshop
  - Talk at HPT
  - Fruitful contacts with LAGUNA people

The emerging concept

- Target-Collector: adopt multiple (4) target+collector systems to mitigate the difficulties
- Target: explore the feasibility of a static solid target
- Keep pebble-bed and powder jet as more advanced solutions
- Collector: use as a baseline the CERN NF prototype and then optimize further → see Andrea slides

On our to do list:

- Feasibility of a static carbon target:
  - Dimensions
  - Deposited energy
  - Radiation dose
  - Heat exchange system
- Optimization of the horn
- Lifetime of target and horn
- Beam window
- Integration
- for a detailed workplan see http://indico.in2p3.fr/conferenceDisplay.py?confId=1586

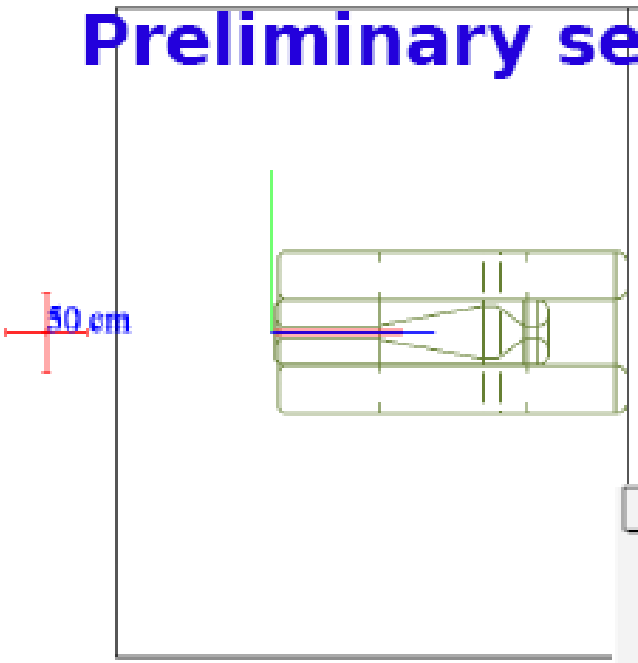
Overall schedule concept

2009: establish viable baseline

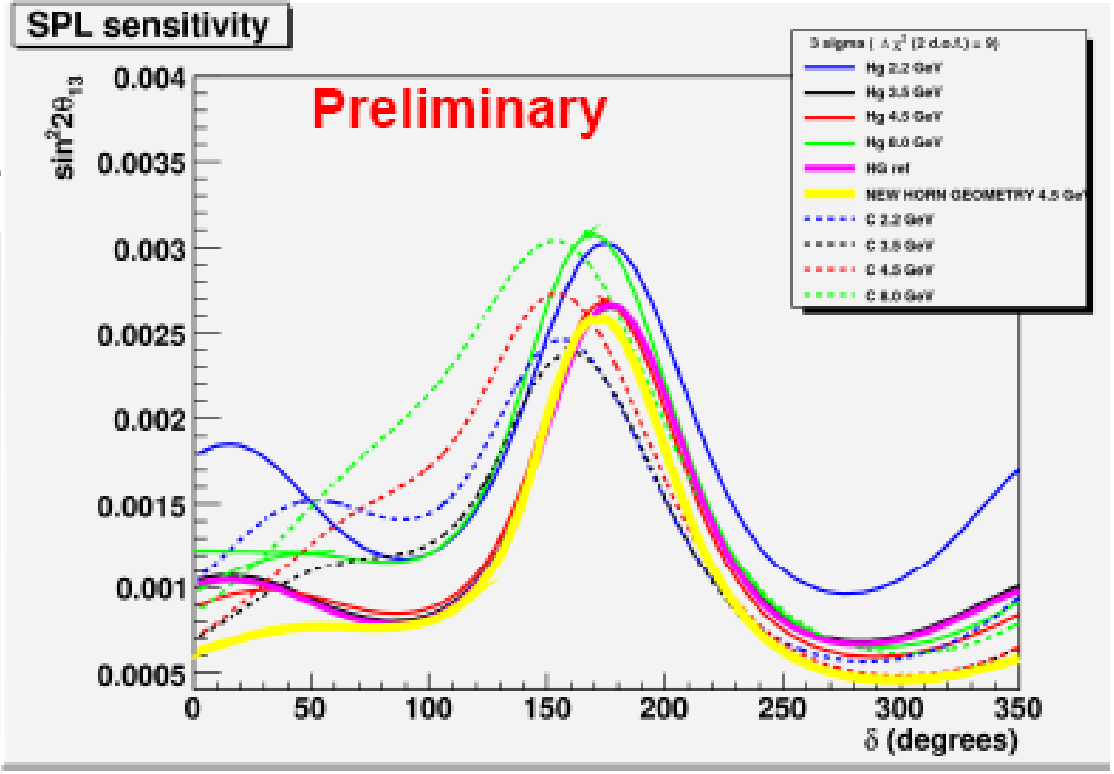
2010: preliminary design

2011: finalized design

Preliminary sensitivity with a new horn shape



Reflector thicker by 10cm, ~same length
Usual 300/600 kA for Horn/Reflector
more "closed", lower antinumu contamination



Caveats.
no aluminum cage at present
nu_e almost but not completely reproduced with g4

Comments and questions from IAP

While the Superbeam concept is the most technically advanced, an integrated approach to its design was not evident. The various subsystems should be considered together, and environmental protection should be an important design consideration from the outset. [WP2]

It was not clear from what was presented that 130 km is an optimal Superbeam baseline. Having options for other baselines, to be identified in discussions with WP6, would be prudent. [WP2]

- Implications of the proposed “4-horn” system should be evaluated in detail before adopting this as the baseline configuration. [WP2]

- For both WP2 and WP3, the choice of a 4 MW proton driver needs firmer justification. [WP2 & 3]

Comments and questions from IAP

- proton driver: a discussion of these requirements now exists in the note of WP2 (first deliverable).

- integrated approach. Considered from the start. Need to mention the environmental approach (from T2K studies)

- optimality of 130 km ? Need to discuss with WP6. Need to mention mass hierarchy from atmospherics (Maltoni)

- four targets/horns system. Study needed for the efficiency of the system

- 4 MW for proton driver ? Studied. Sensitivity scales as expected as 1/sqrt(power)

Deliverables

Deliverable	Delivery date (months)	
Requirements for proton driver	6	
Target and Collection design report	30	
Target and Collection integration	36	
Beam characteristics	36	
Final report	48	

Milestones

Milestone	Delivery date (months)	
Proton driver report	12	
Prel. Design of Target and Collection	24	
1st Target and Collection integration drawings	24	
1st Est. of Nu Beam Intensity	24	
Final Target and Collection integration drawings	36	
Design of target station	40	
Report on Nu Beam Intensity	42	

Goals of this meeting

- Status of activities -
  - Target-beam simulation
  - Target(s)
  - Horn
  - Integration
- Prepare a work plan for next year
- Set up realistic internal milestones
- Discussion of the group organization and meetings

- Next step: from baseline to preliminary design

Agenda -morning

9:30 Marco WP2 milestones, organization and next steps

9:45 Andrea Target, horn simulations and sensitivities

10:15 Chris Towards a conceptual design of the target

10:45 Peter Powder jet target

11:15 Christoph Target material studies

11:30 Marcos Horn studies

11:45 Piotr Target-horn integration

12:15 Discussions on next steps (to be continued in the afternoon if needed)

12:30 – 13:30 lunch

Agenda- afternoon

13:30 – 14:30 Site visit to see T2K target and beam window components + fluidised tungsten powder plant.

Other visits are possible if time permits,.

14:30 – 17:00 Combined EUROnu WP2 (SB) and WP3 (UKNF WP1) meeting Building R27 (Atlas centre) Conference Room 8

19:00 Dinner in Oxford*