

# **WP4's Response to IAP**

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Christian Hansen

**On behalf of Elena Wildner!**

# Database

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21. To date there has been no real progress on the costing exercise, although the group has developed a parameter list that will aid in this effort. Making progress will require engineering resources that (as for most of the other WPs) are not presently identified. [WP4]

- **Correct and the database can be viewed and downloaded (pdf) from here:**  
<http://cern.ch/bbfp?parameters>

# Ion Production

22. We agree with the proposed plan by WP4 to complete the production experiments on  $^{18}\text{Ne}$ ,  $^8\text{B}$ , and  $^8\text{Li}$ . We suggest that ANL staff be contacted about their experience with a liquid-Li “curtain” target. [WP4]

- **A CERN project associate will start in May to study the Molten-Salt approach that could potentially provide sufficient  $^{18}\text{Ne}$**
- **The  $^8\text{B}$  cross section experiment will take place:**

I am pleased to inform you that our experimental proposal “8B Production Measurement For the FP7 Beta Beam Design Study” is accepted by the Legnaro USP/PAC.

*(Email from V. Kravtchouk, Legnaro)*
- **The  $^8\text{B}/^8\text{Li}$  Production Ring studies are ongoing (Contacted J. Nolen (ANL), but no response yet)**

# ECR

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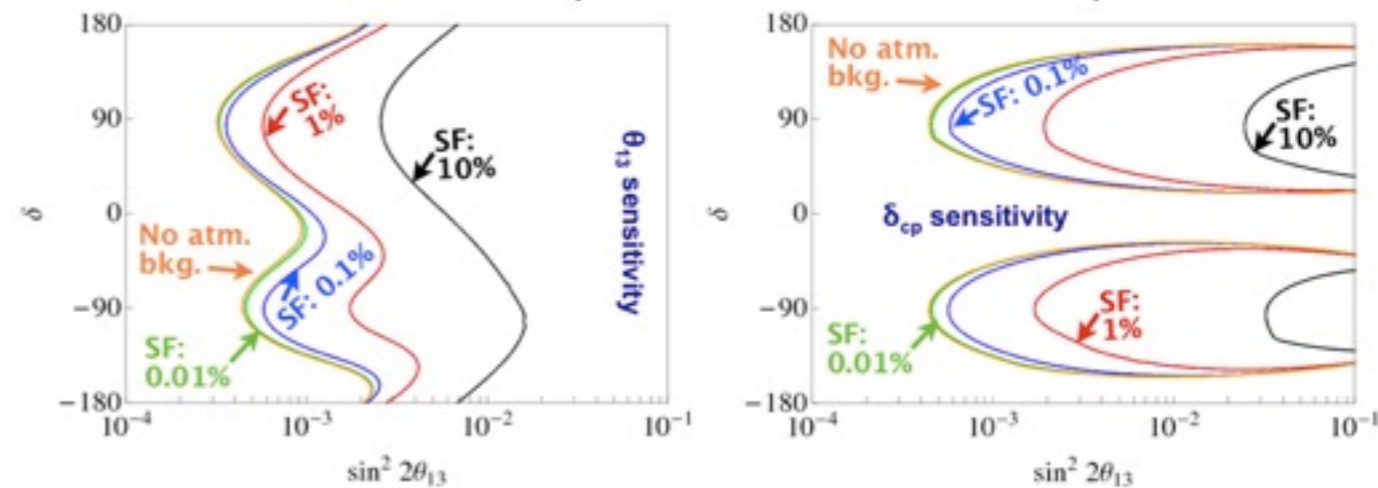
23. The ECR development work should be continued. [WP4]

- **Yes, to continue is of high importance for the Beta Beams**

# Baseline

24. The Beta Beam group needs to settle soon on a final scenario to serve as the basis for the cost estimate, including the choice of isotopes, their production mechanisms, and the corresponding production rates. The decay ring RF system solution must also be defined. [WP4]

- **Baseline is defined to “ $\gamma=100$ ,  $^{18}\text{Ne}/^6\text{He}$ ”**
- **“Nominal”  $\nu$  rate:  $1.1 \times 10^{18}$   $\nu$ /year &  $2.9 \times 10^{18}$  anti- $\nu$ /year**
- **not yet shown to be achievable with acceptable suppression factor**
- **G. Burt (STFC) will show first report of the DR’s RF studies next WP4 meeting (LNL, June)**



# Physics Reach (1/2)

25. It appeared to the IAP that there is still tension between the baseline scenario favored by WP4 and that considered “competitive” by WP6. While we cannot make the choice for you, we reiterate the importance of maintaining a single consistent baseline scenario that is used for both the costing and the performance evaluation. We also note that a scenario deemed non-competitive today may well become more interesting when costs are included in the evaluation. [WP4, WP6]

- **WP4 does not “favor” any scenario**
- **It is in our mandate to study “ $\gamma=100$ ” (both low and high Q) at CERN**

# Physics Reach (2/2)

25. It appeared to the IAP that there is still tension between the baseline scenario favored by WP4 and that considered “competitive” by WP6. While we cannot make the choice for you, we reiterate the importance of maintaining a single consistent baseline scenario that is used for both the costing and the performance evaluation. We also note that a scenario deemed non-competitive today may well become more interesting when costs are included in the evaluation. [WP4, WP6]

- **A very first version of “ $\gamma=350$ ” DR was made to show the feasibility and challenges**
- **It is a workable start but considerable work needs to be invested on this version**
- **This work is not the mandate of EUROnu and the resources are too sparse to continue on this for the moment**

# Database & Impedance (1/2)

26. Parameter list updates are needed for all ion species, as are impedance specifications for what is allowable from the viewpoint of collective effects. We saw good progress at this during the meeting. We note that a conceptual design for the vacuum chambers may be needed to ensure that the impedance specifications are credible. [WP4]

- **Yes, the database needs to be updated, e.g. changes due new DR lattice**
- **We showed the percentage of “nominal” ions the DR could allow, assuming 1 MΩ/m, for different scenarios suggested by WP6**

$R_{\perp}^{DR} =$ 1 MΩ/m	Bunch Intensity Limit, $N_b^{th}$	
	[e12]	[% of $N_b^{nom}$ ]
<sup>6</sup> He	10	224
<sup>18</sup> Ne	1.2	35
<sup>6</sup> He	10	112
<sup>18</sup> Ne	1.2	70
<sup>6</sup> He	10	112
<sup>18</sup> Ne	1.2	175
<sup>8</sup> Li	5.9	129
<sup>8</sup> B	2.1	127
<sup>8</sup> Li	5.9	65
<sup>8</sup> B	2.1	64
<sup>8</sup> Li	5.9	26
<sup>8</sup> B	2.1	25



# Database & Impedance (2/2)

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26. Parameter list updates are needed for all ion species, as are impedance specifications for what is allowable from the viewpoint of collective effects. We saw good progress at this during the meeting. We note that a conceptual design for the vacuum chambers may be needed to ensure that the impedance specifications are credible. [WP4]

- **Conceptual design for vacuum chambers, to study the possibility of 1 M $\Omega$ /m in the DR, is a necessary project**
- **Experts help will be needed**

# Ions & Impedance (1/2)

27. The main technical risks for the Beta Beam facility appear to be the production of sufficient quantities of isotopes and achieving sufficiently low impedance in the decay ring. Both of these are being pursued vigorously by WP4. [WP4]

## ● Yes

- **Studies for the molten-salt conceptual idea will start in May to show the feasibility to produce enough  $^{18}\text{Ne}$**
- **$^8\text{B}$  cross-section will be studied in Legnaro**
- **Possible experiment with the Japanese ERIT FFAG ring could show if ionization-cooling works**
- **Possible experiment with TSR ring (to be moved to CERN from Heidelberg) could show  $^8\text{Li}$  &  $^8\text{B}$  production rate**

# Ions & Impedance (2/2)

27. The main technical risks for the Beta Beam facility appear to be the production of sufficient quantities of isotopes and achieving sufficiently low impedance in the decay ring. Both of these are being pursued vigorously by WP4. [WP4]

- **Yes**

- **Studies so far has only taken into account Transversal Broad Band Resonance Impedance**

- **Studies have also been done for DR  $\gamma=350$**

  - \* **Similar results as for  $\gamma=100$**

- **Studies are also ongoing for SPS**