Update on plans to resolve the P42/T10 spot size issue

117th EATM

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Reminder: P42 focus on T10

- The normal beam spot on T10 has a width of around $\sigma = 300 \mu m$ to $\sigma = 400 \mu m$. In 2018, it was found to be about 600 to 700 $\mu m$, so about 20% of the beam misses T10.
- Even though anyway 40% of the protons traverse T10 without interacting, this loss is costly in proton flux and may create background to NA62.
- Full $K^+$ production could be recovered by reducing the magnification at T10 from $(0.5_H, -1.0_V)$ to $(0.44_H, -0.66_V)$ with good beam performance.
Current Situation

• The collimator scans of Nov. 11th 2018 hint towards a cause upstream of Collimator 2, which is located 288 m downstream of T4.
• The RP surveys downstream of TCC2 show no clear hint for material in the beam. There is a hotspot at QNL.043169 (Q10), but this hints again at an origin upstream.

<table>
<thead>
<tr>
<th>Eléments/Positions</th>
<th>Mesures AD6 au contact [µSv/h]</th>
<th>Mesures AD6 à 40 cm [µSv/h]</th>
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</thead>
<tbody>
<tr>
<td>BBS.43166</td>
<td>110</td>
<td>30</td>
</tr>
<tr>
<td>BSP.43167</td>
<td>230</td>
<td>60</td>
</tr>
<tr>
<td>QNL.43169</td>
<td>3600</td>
<td>60</td>
</tr>
<tr>
<td>MDXH.43171</td>
<td>560</td>
<td>40</td>
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18.07.2019
Action Plan

• Check again polarities and currents in P42 as soon as cooling water is available (~April). Try to check also TCC2 magnets, especially frontend, if environment allows for it.

• Check / remove BSPs, BTVs and BBSs in P42. Two candidates BTV.043061 and BSP.043062 are close to M2 TAX, to be seen.

• Check P42 TAX holes for hints of structural failures / material. Check correct TAX movement.

• Prepare mitigation measure in case problem still cannot be identified, i.e. install additional QNL at 710m (“Q18a”) and connect in series with current Q18, both to be operated at -205A with NR11-100.