High power RF conditioning of the TRASCO RFQ

## Main Parameters

<table>
<thead>
<tr>
<th>Main RFQ parameters</th>
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<tbody>
<tr>
<td><strong>Type</strong></td>
</tr>
<tr>
<td><strong>Structure</strong></td>
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<tr>
<td><strong>Frequency</strong></td>
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<tr>
<td><strong>Proton current</strong></td>
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<tr>
<td><strong>Proton energy</strong></td>
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<tr>
<td><strong>Inter-vane Voltage</strong></td>
</tr>
<tr>
<td><strong>Q₀ (SF 2D)</strong></td>
</tr>
<tr>
<td><strong>RF Power dissipation 2D</strong></td>
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<table>
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<th>First segment parameters</th>
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<tr>
<td><strong>Frequency</strong></td>
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<tr>
<td><strong>Inter-vane Voltage</strong></td>
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<tr>
<td><strong>Q₀ Expected(SF/1.3)</strong></td>
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<tr>
<td><strong>RF Power diss. (exp.)</strong></td>
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<tr>
<td><strong>Freq. detuning (full power)</strong></td>
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<tr>
<td><strong>Field flatness</strong></td>
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</tbody>
</table>
RF Test Stand at CEA

Collaboration agreement between INFN and CEA for TRASCO high power test in CEA Saclay
## Results

<table>
<thead>
<tr>
<th>Measured Parameters</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Inter-vane Voltage</td>
<td>68 kV CW (1.8 Kilp.)</td>
</tr>
<tr>
<td>$Q_0$</td>
<td>8460</td>
</tr>
<tr>
<td>RF Power diss.</td>
<td>192 kW</td>
</tr>
<tr>
<td>Freq. detuning (full power)</td>
<td>-238 kHz</td>
</tr>
<tr>
<td>Field flatnes</td>
<td>±2%</td>
</tr>
</tbody>
</table>

**Peak cavity power, obtained as function of the cavity voltage.**
Results

Inspection of internal surface and termination plates after high power test

Traces of discharge on vane tips high energy part (low field region) and on high energy termination plate
Conclusions

- Nominal voltage achieved in steady state CW operation.

- 120 % of the nominal voltage achieved in pulsed mode (0.1% DC).

- Power balance requires 900 kW for accelerating 40 mA proton beam up to 5 MeV with 10 % of margin on cavity voltage.

- Noses region has strong impact on frequency detuning and field flatness. Final tuning must take into account these effects.