# Beam Tune to TITAN

Note: This document is based on the tuning exercise performed for experiment S1073. A stable tune was established from ISAC1 to the TITAN RFQ, for mass 28 [12C-16O]at 16.32 kV, from a High Power SiC target(p+ = 65uA), TM3 FEBIAD ion source . This tune was subsequently used to deliver mass 26 [12C-14O] RIB to the experiment. TITAN have confirmed the presence of mass 26 (delivered from the RIB source) in their Penning trap. Based on the observations, a mode of tuning upto TITAN is suggested.

Pre-requisite:
A stable beam tune from RIB source to ILT:FC25 .
Beam is tuned with TITAN RFQ in DC mode.

Procedure:
- Tune beam from ILT:FC25 to ILE:FC5 to maximize transmission. An existing tune can be used for the 90 degree bend [ILE:B1 and ILE:B4]. If not available, we start with theoretical values for this section
- Beam is then checked on ILE:RPM5 for centering and focusing
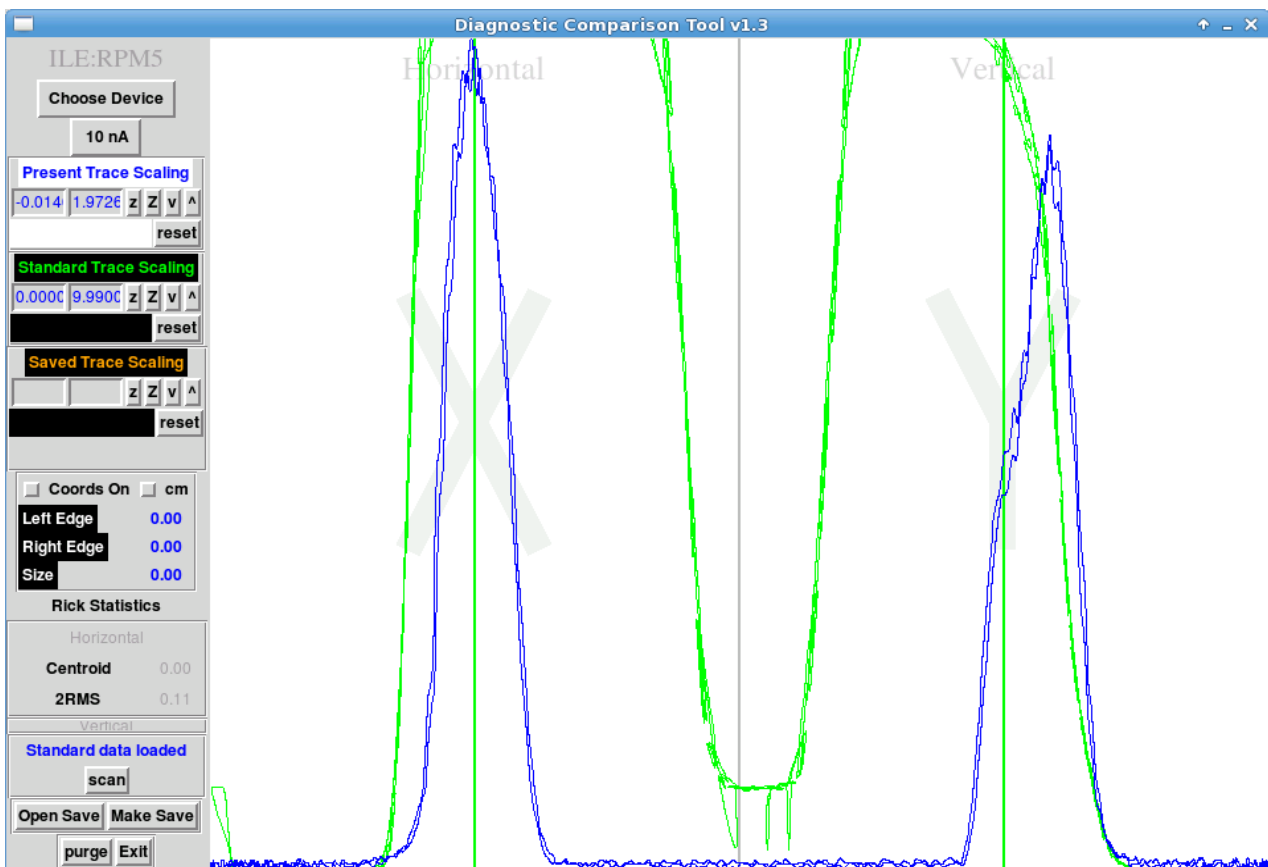

A sample scan of RPM 5 is attached

- Post ILE:FC5 to ILE2T:FC3 load the theoretical tune.

An alternative is to scale and load the tune dated *140723_1838.snapiostitan.* This tune is for mass 28 @16.32 kV bias. This tune is consistent with the theory values apart from ILT:Q26 (It is higher than theory).

- Check on all RPMS (ILE RPM5 to ILE:RPM7) for focusing issues. If the beam shape is wide, ILT:Q26 may be tweaked.

Beam should be centered in horizontal plane [X]. Beam is tuned to get it steering free and transmission is maximized to ILE2T:RPM3.

Sample scans from RPMs are attached :
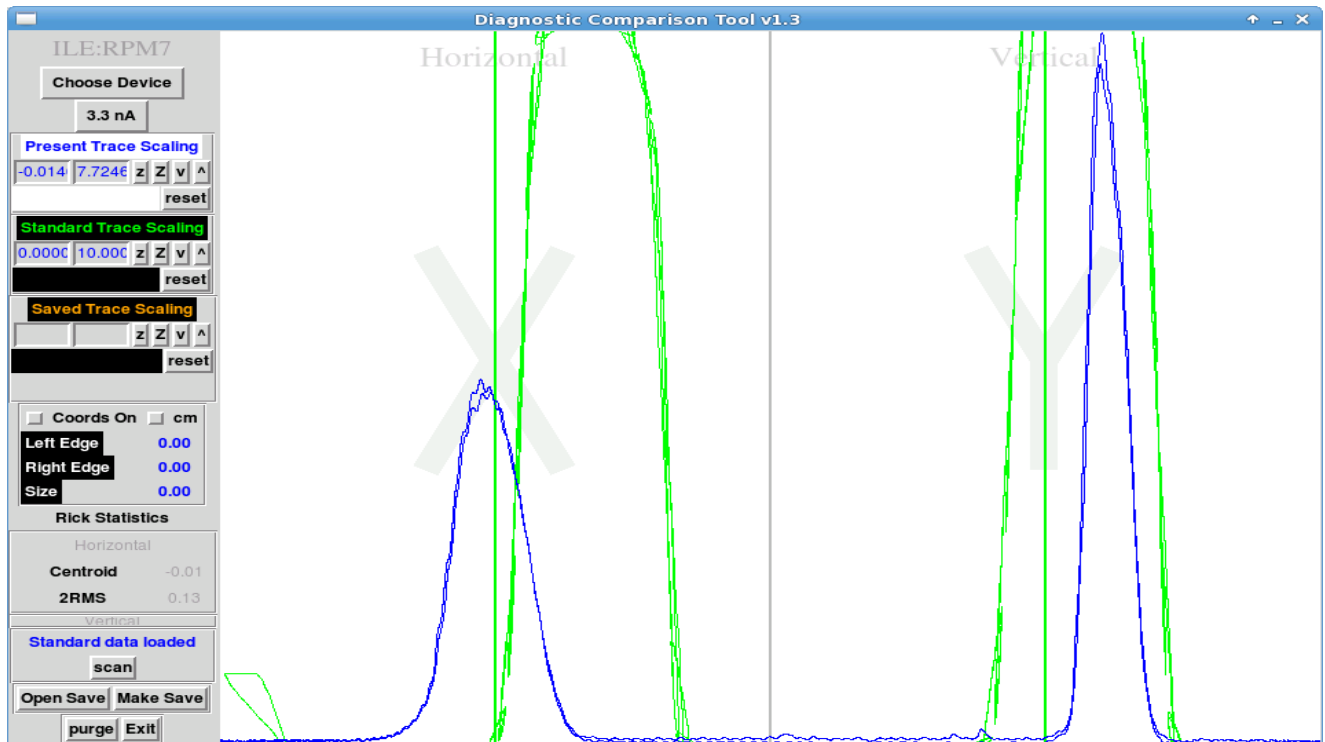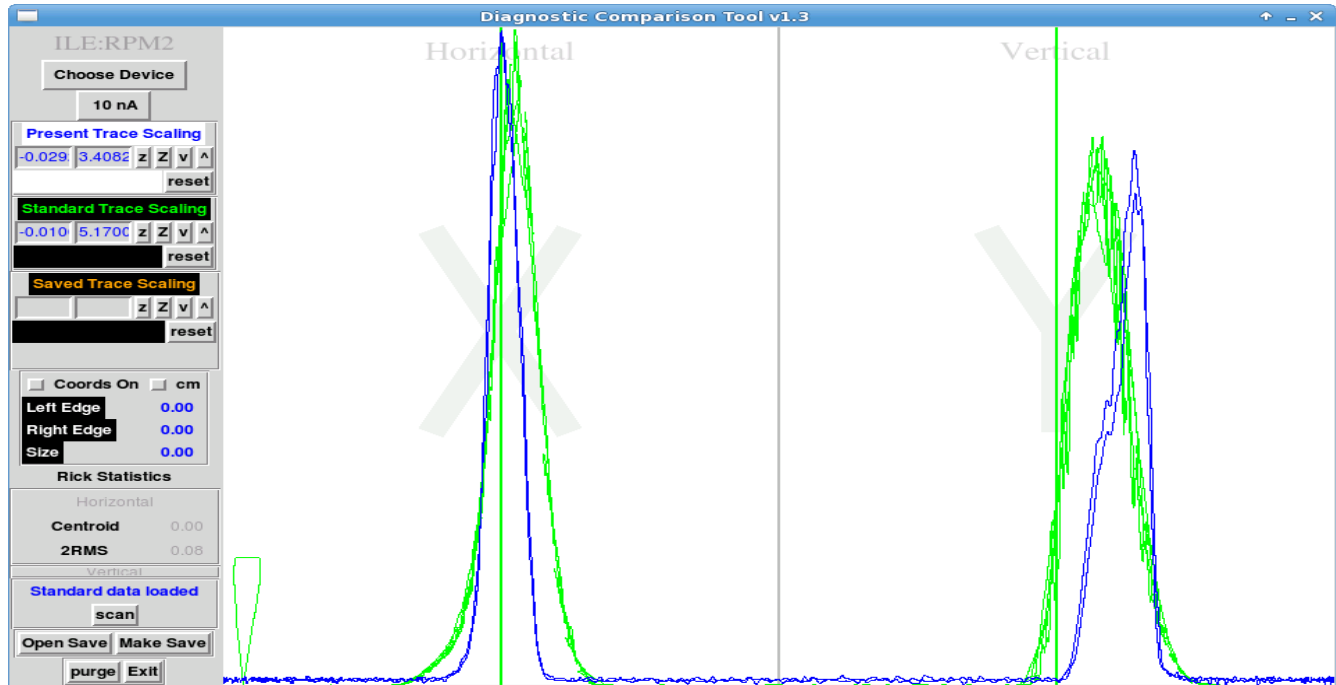
- Once transmission is maximized to IL2T:FC3, a TITAN experimenter is contacted. TITAN lets beam (no more than 70 nA) through the TITAN RFQ till the TRFCBL:FC0.

There would be some steering issues, and based on the feedback from the TITAN experimenters, this needs to be corrected upstream. ILE2T:RPM3 is to be used as the benchmark for this exercise [Note: the benchmark is for this section only and not for the whole beam line], and we should try and get the beam profile similar to the scan shown below.

When beam is finally tuned through the TITAN RFQ, beam intensity on ILE2T:FC3 ***may be lower*** *than the maximum value as optimized before.*
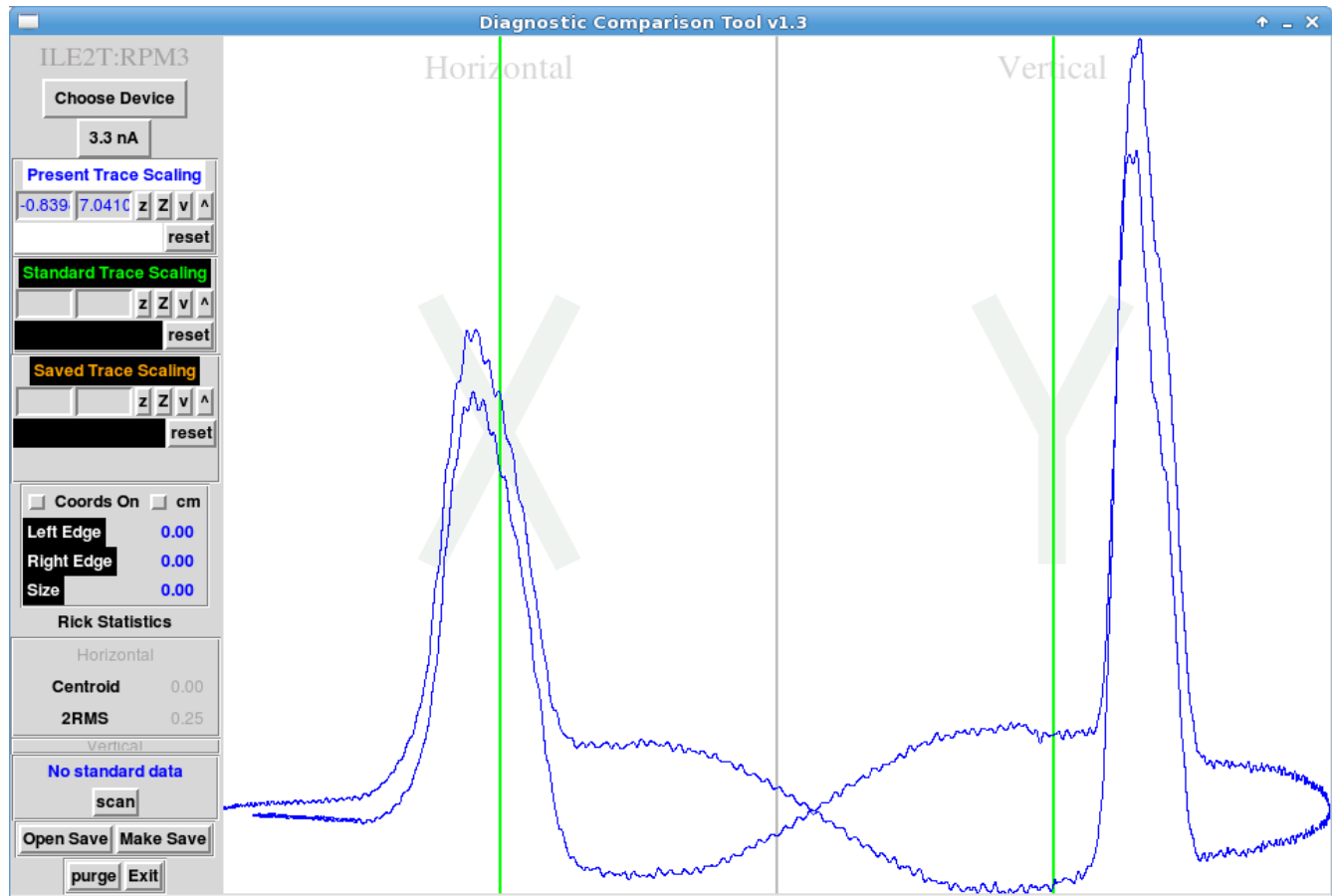
Minor adjustments would be required to the steering to get a better transmission. Still this method would ensure than we have sufficient beam going through to TRFCBL:FC0, to start tuning.

- Once tuning with DC mode is done, TITAN will proceed to tune the beam in bunched mode (0.1 – 1 pA beam intensity). For the bunched mode no changes are to be made to the ISAC tune developed for the DC mode, unless requested by TITAN.

The details of this exercise including the transmission values and RPM scans are available in the ISAC elog dated 23/07/2014. In case of any queries please contact Ayan Sen, Suresh Saminathan (for ISAC tuning) and Ania Kwiatkowski (TITAN).