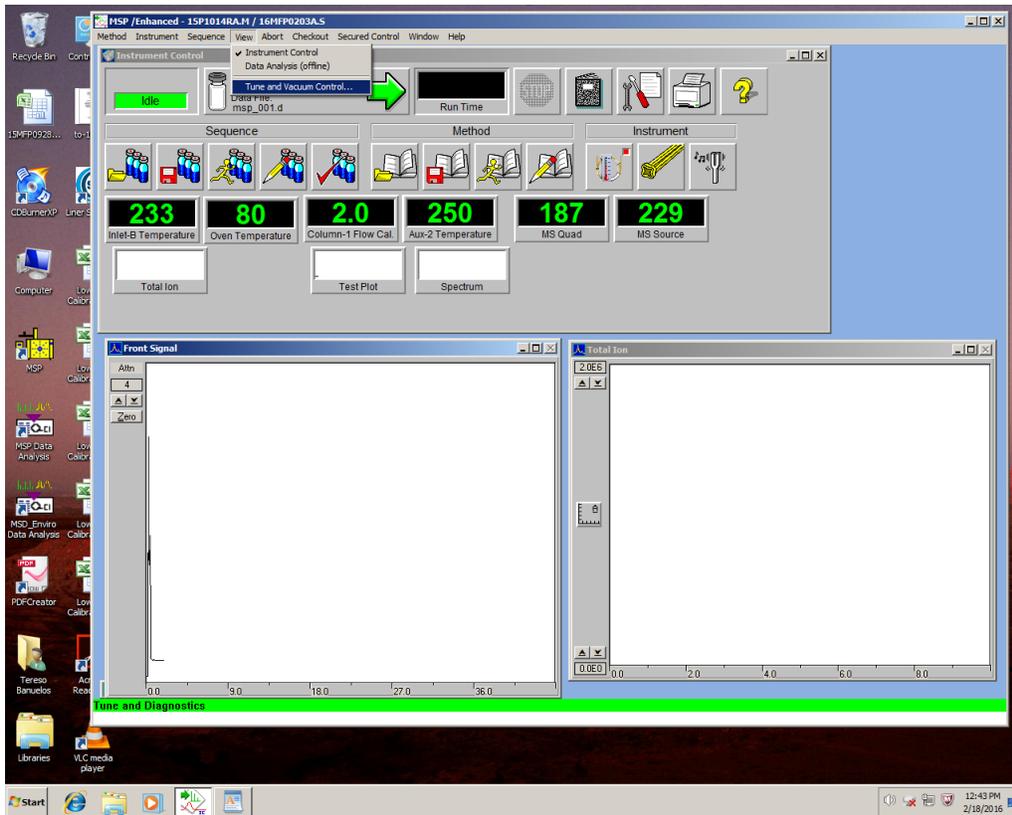
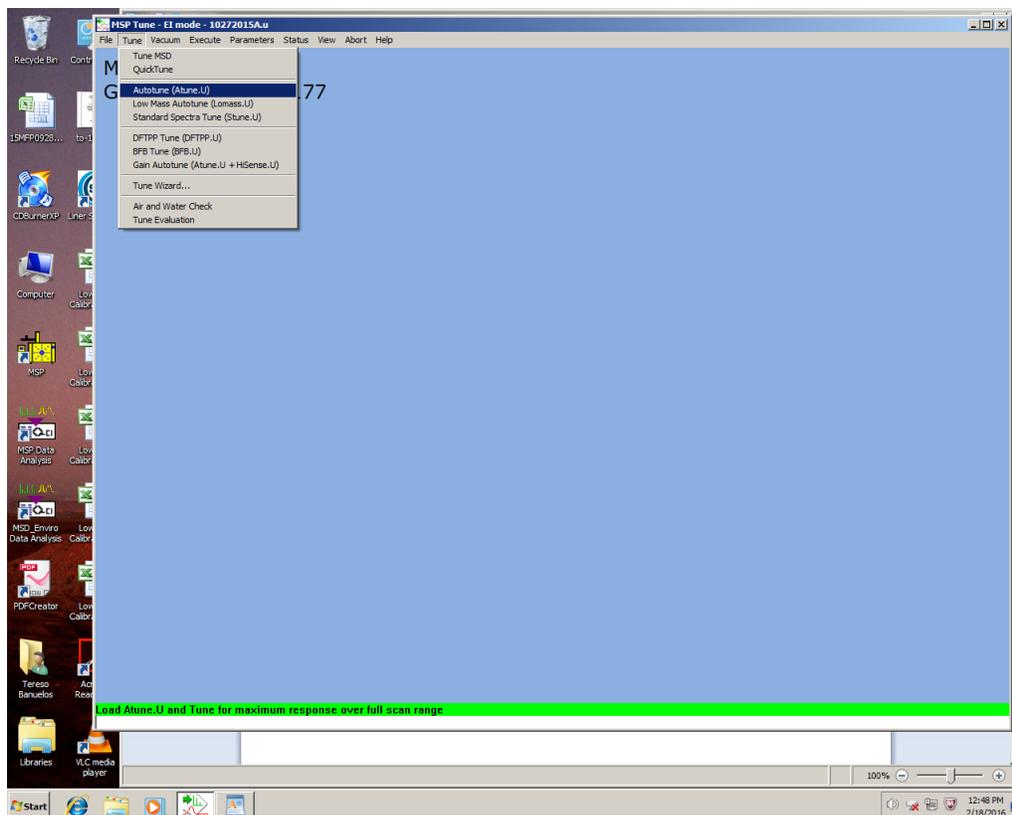


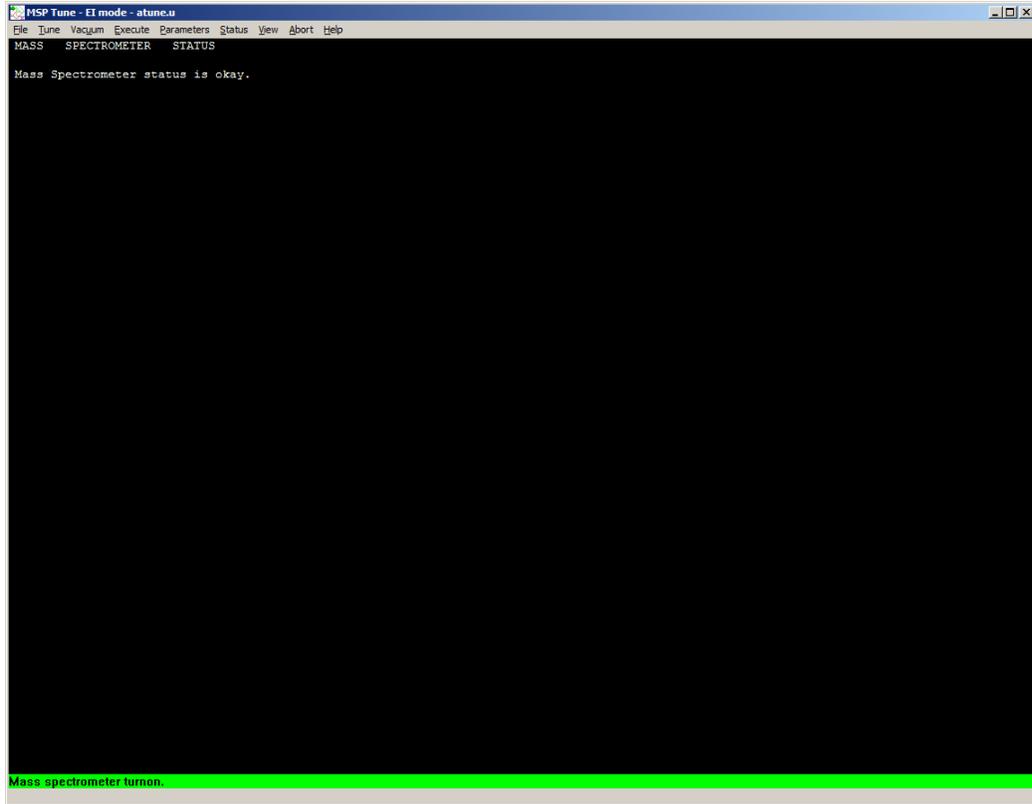
Before manually tuning the instrument, the instrument should be probably be auto tuned by using the Tune and Vacuum Control on ChemStation software. The screen below shows how to activate the Tune and Vacuum Control under View of the menu bar.



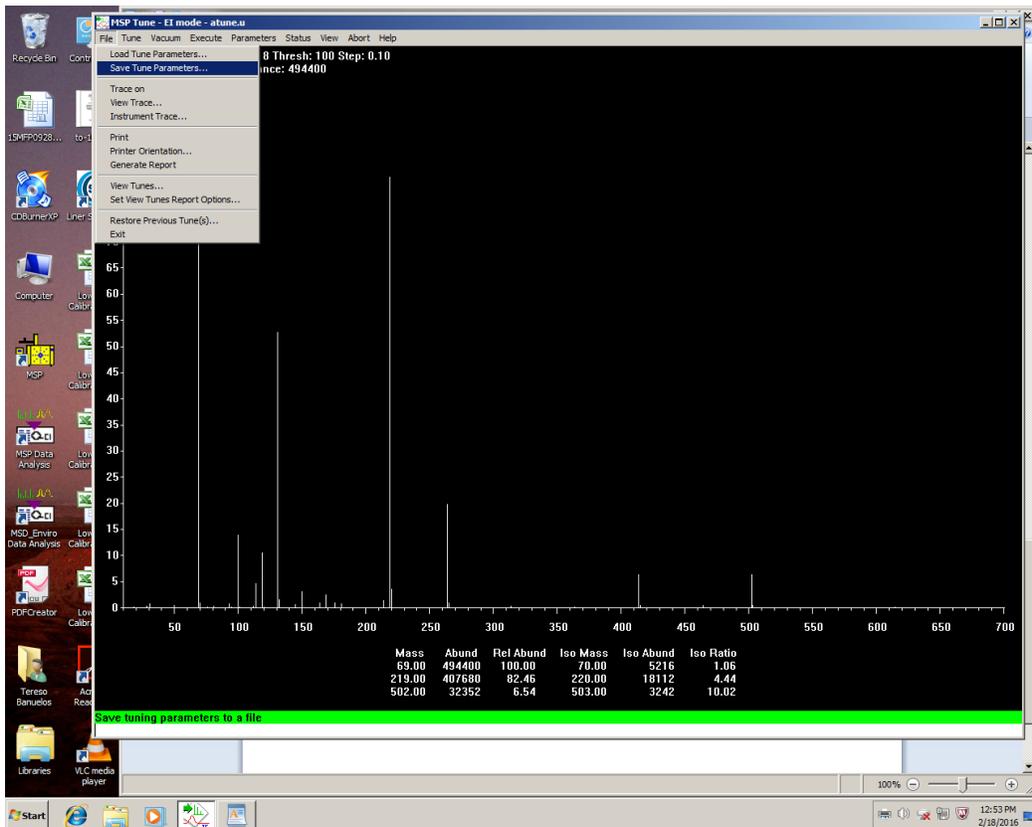
After highlighting the Tune and Vacuum Control, you should see the screen below. Please note that we have selected the Tune on the menu bar. Next we have selected the Auto Tune option. You can skip the Auto Tune step, but doing an auto tune on the instrument will not harm the mass selective detector.



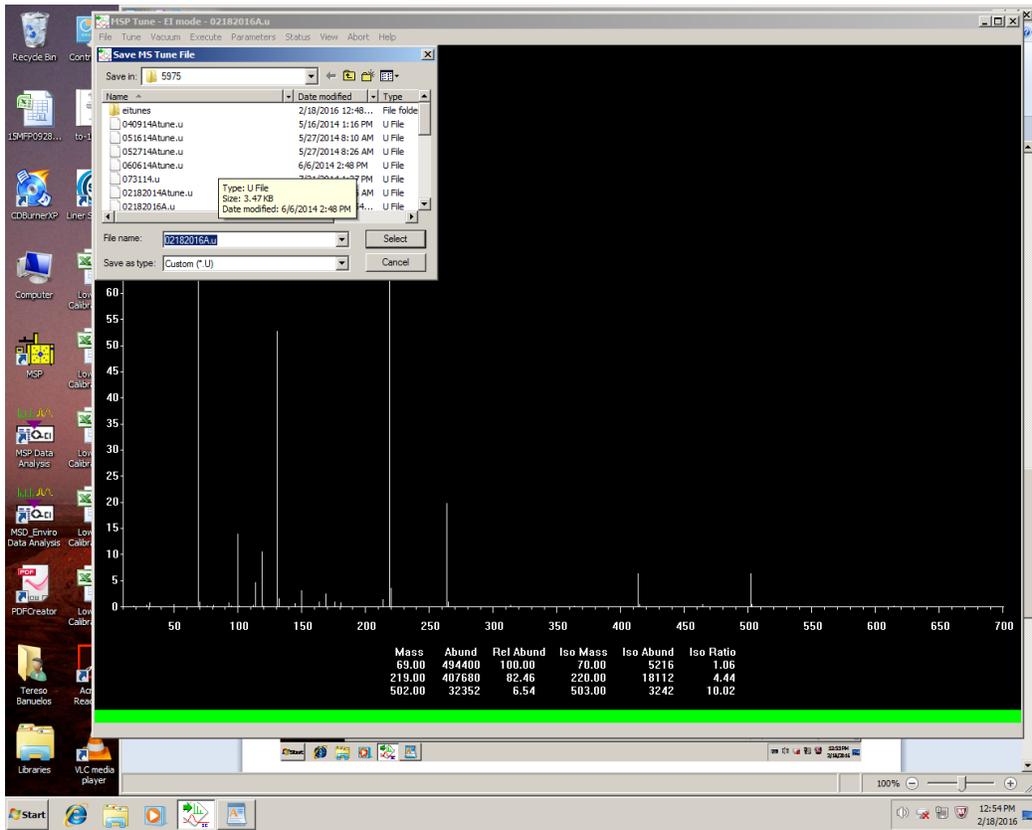
When you auto tune, you will see a screen similar to the one below and the instrument will go through the tuning process which should take less than 10 minutes.



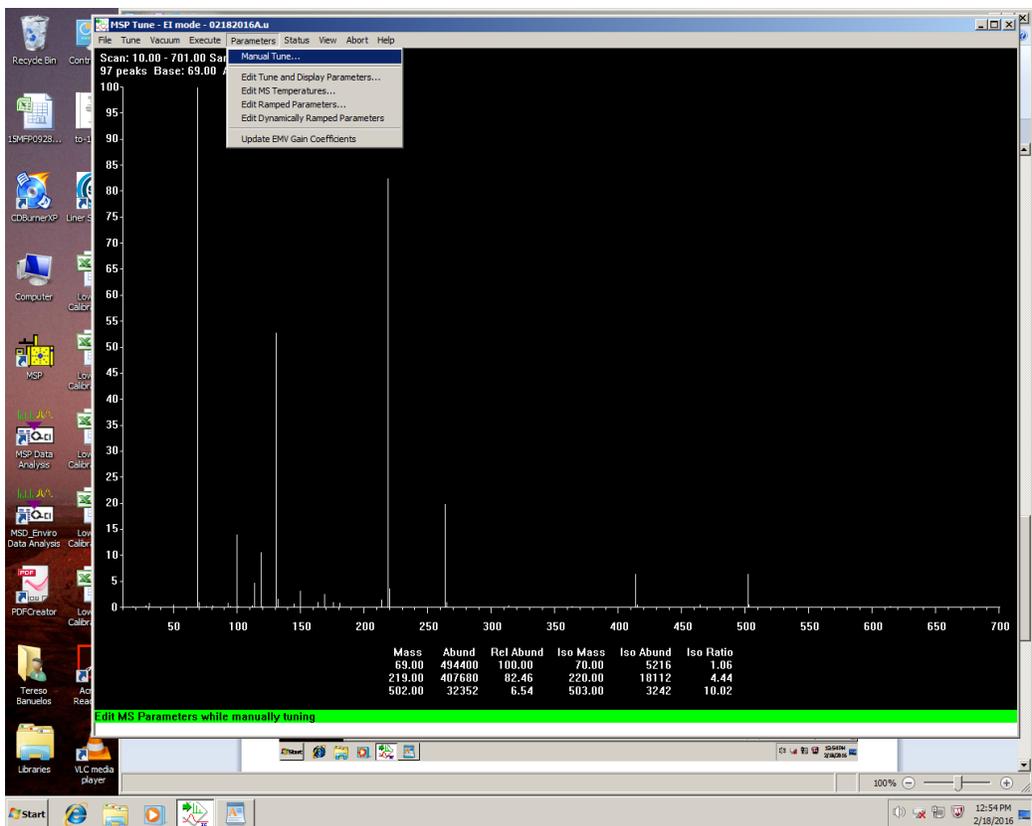
When the tuning process completes, you should save the generated tune file by selecting the File option on the menu bar and selecting Save Tune Parameters.



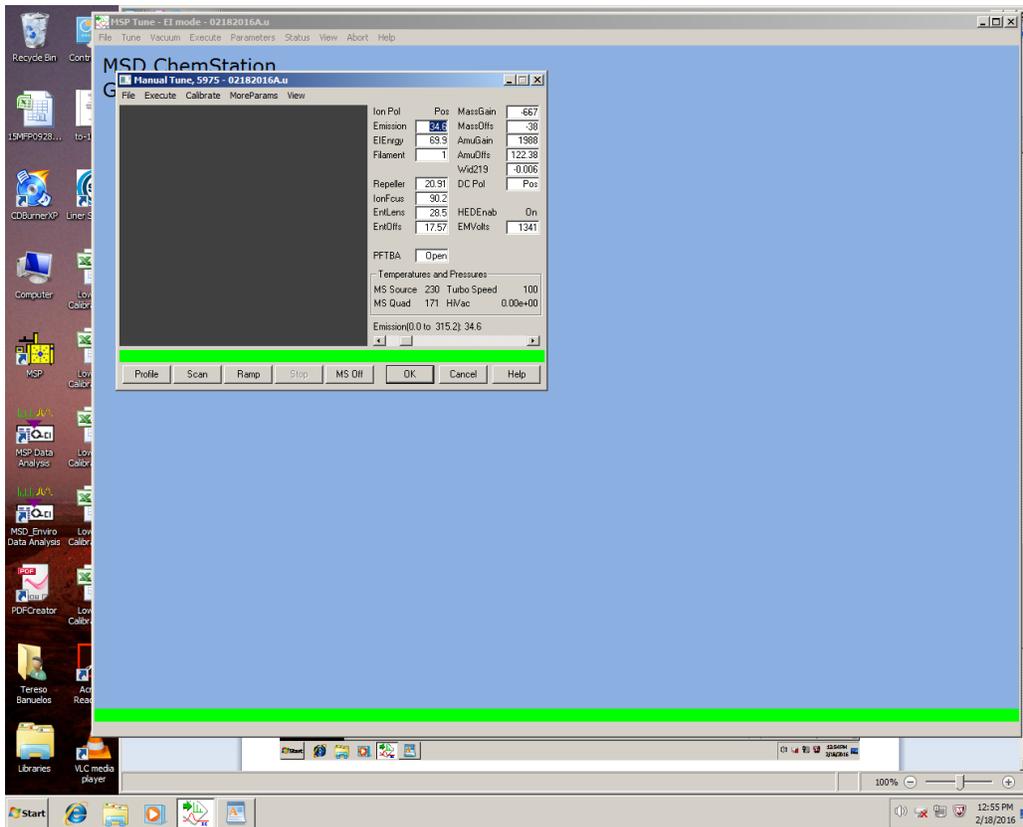
You should rename the file to something other than atune.u because the original atune.u file will be overwritten and the original factory starting parameters used for auto tuning will be lost. In the example below we have named the file 02182016A.u which is the auto tune date followed by an A to indicate that the tune file was generated by auto tune.



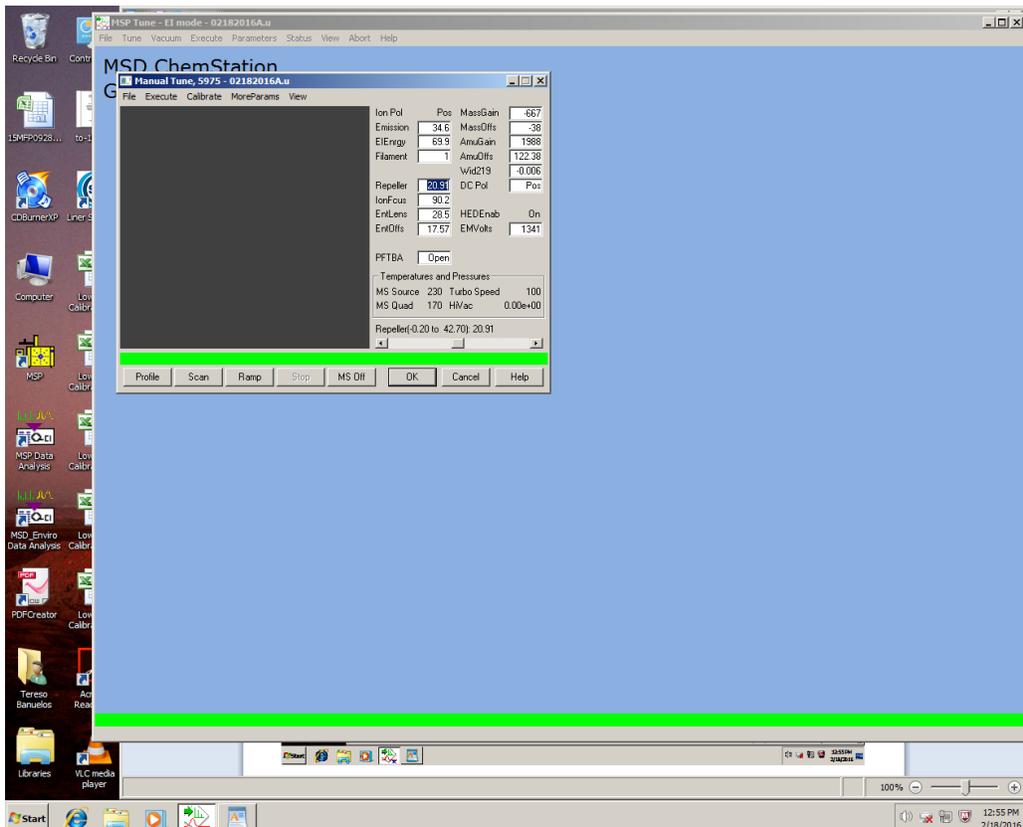
In order to pass BFB using the TO-15 criteria, one has to manually tune the instrument and maximize the 69 mass ion. This can be accomplished by selecting the Parameters options on the menu bar and highlighting the Manual Tune option.



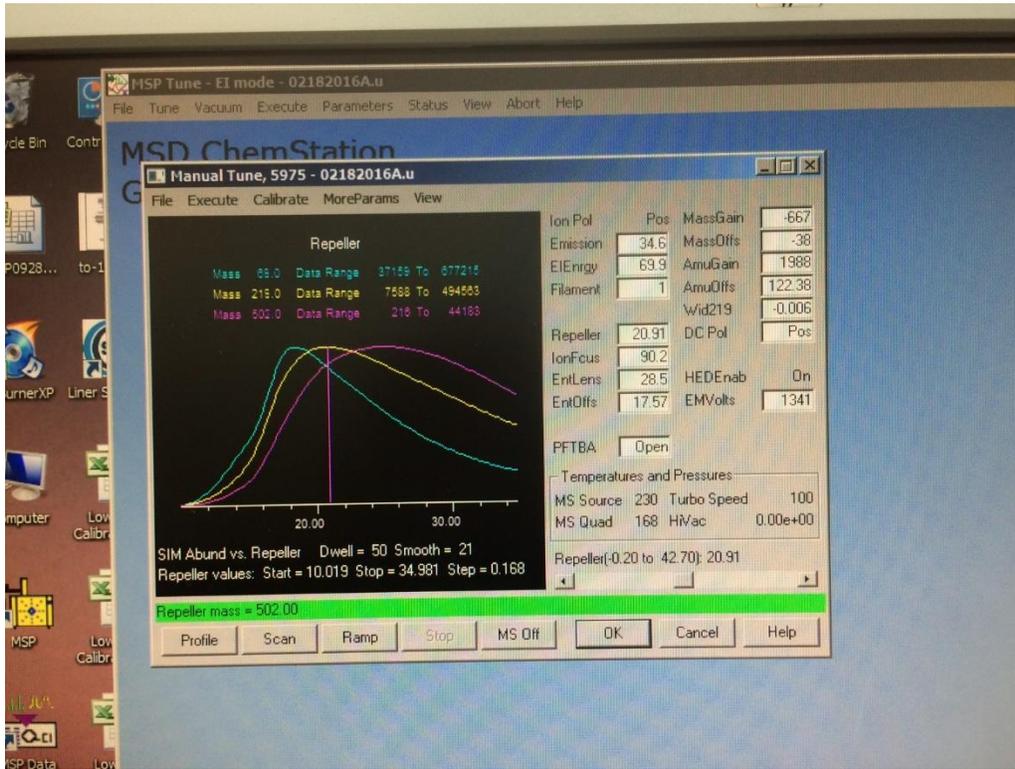
Once the Manual Tune option has been selected, you should see the screen below.



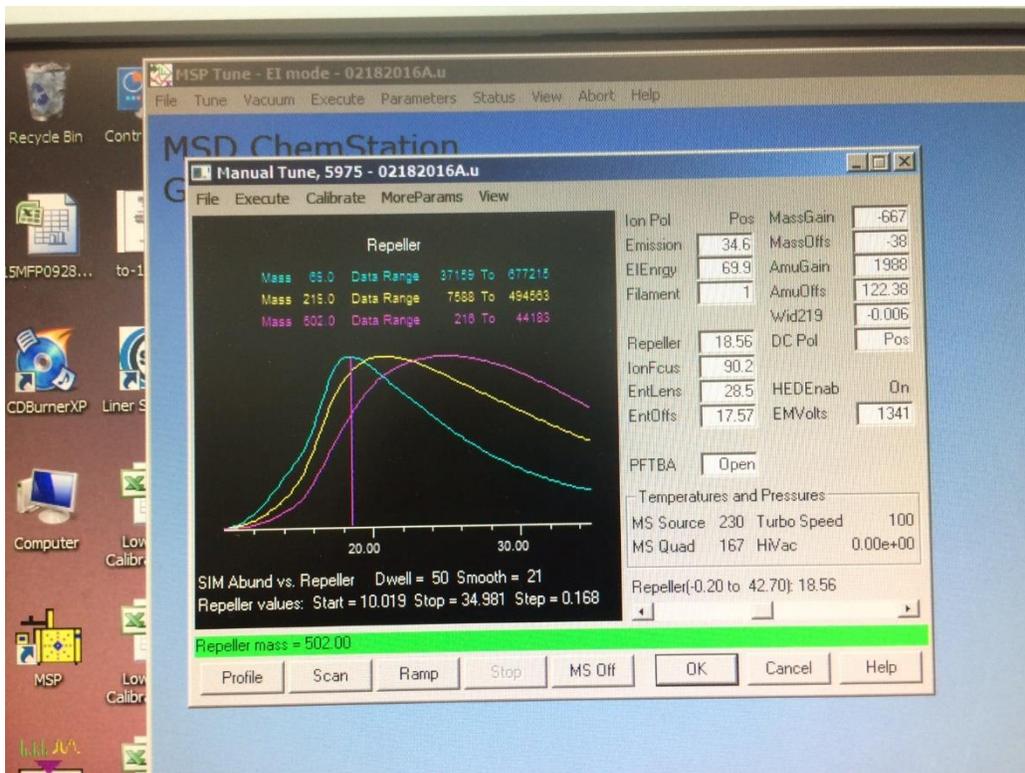
The parameters that need to be optimized to the 69 mass ion are the Repeller, Ion Focus, Entrance Lens, and Entrance Lens Offset. In order to optimize the Repeller, highlight the Repeller value and press the Ramp button at the bottom of the Manual Tune window.



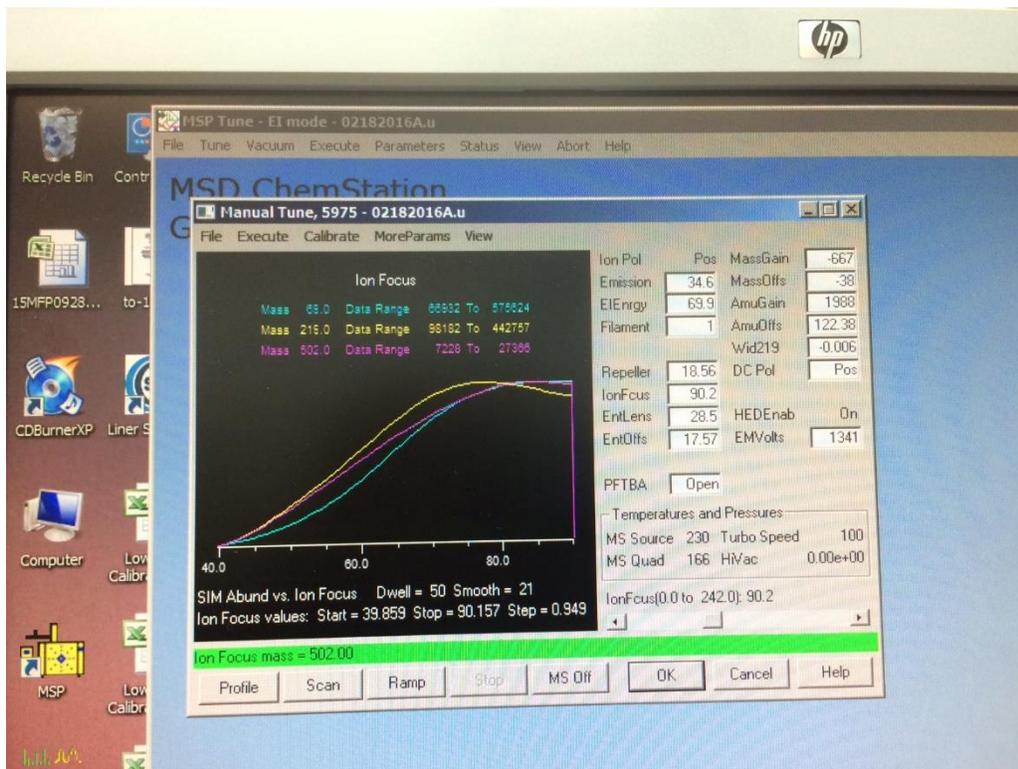
You should then see the ramp curves for the 69, 219, 502 mass ions. You should also see a pink or magenta optimization line which can be moved by placing the mouse on this line, pressing the mouse, and moving the line to the desired position. In this case, we want to optimize the 69 ion and not the 219 ion. Please note that you can move the magenta line with the mouse or by typing a value in the Repeller field.



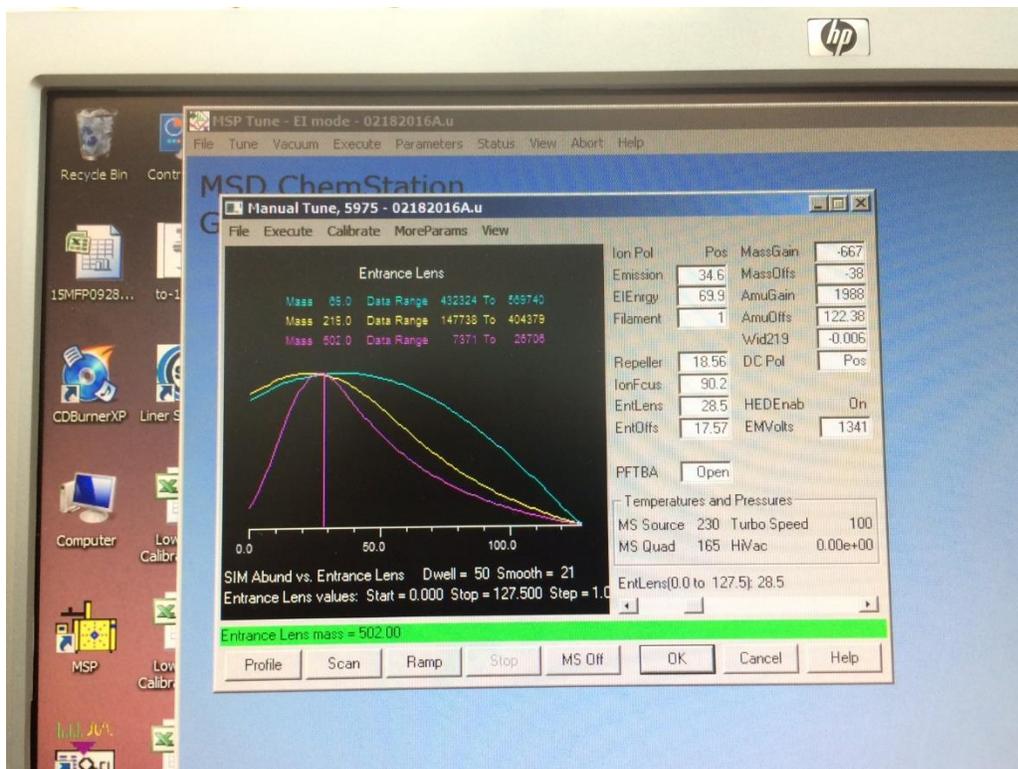
After moving the magenta line or typing a value in the Repeller field to optimize the 69 mass ion, you see a screen similar to the one below:



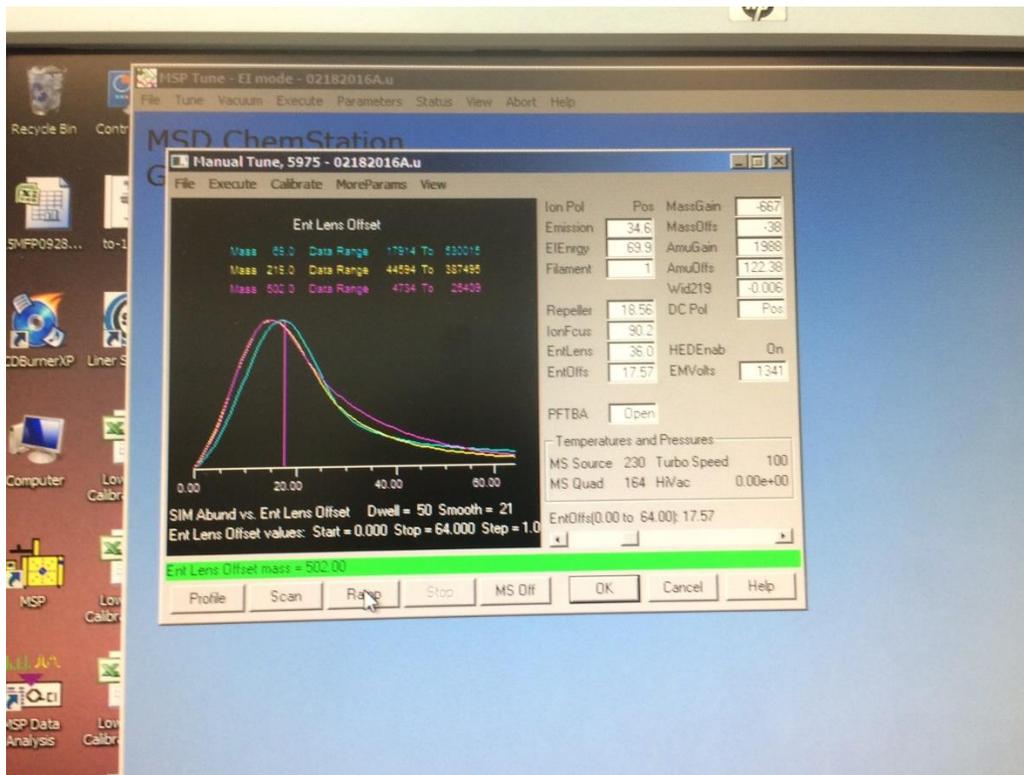
Next, highlight the Ion Focus field and press the Ramp button. The optimization procedure is the same as the Repeller, maximize the 69 mass ion by moving the magenta line or typing values in the Ion Focus field. When ramping is complete you should see a screen similar to one below:



Next, highlight the Entrance Lens field and press the Ramp button. Next, highlight the Ion Focus field and press the Ramp button. The optimization procedure is the same as the Repeller, maximize the 69 mass ion by moving the magenta line or typing values in the Entrance Lens field. When ramping is complete you should see a screen similar to one below:

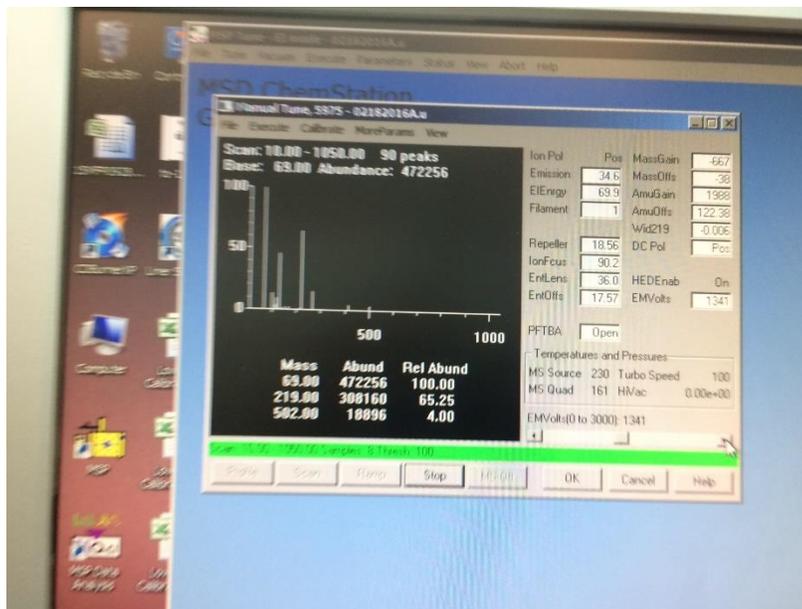


After maximizing on the 69 mass ion, highlight the Entrance Lens Offset and press the Ramp button. The optimization procedure is the same as the Repeller, maximize the 69 mass ion by moving the magenta line or typing values in the Entrance Lens Offset field. When ramping is complete you should see a screen similar to one below:

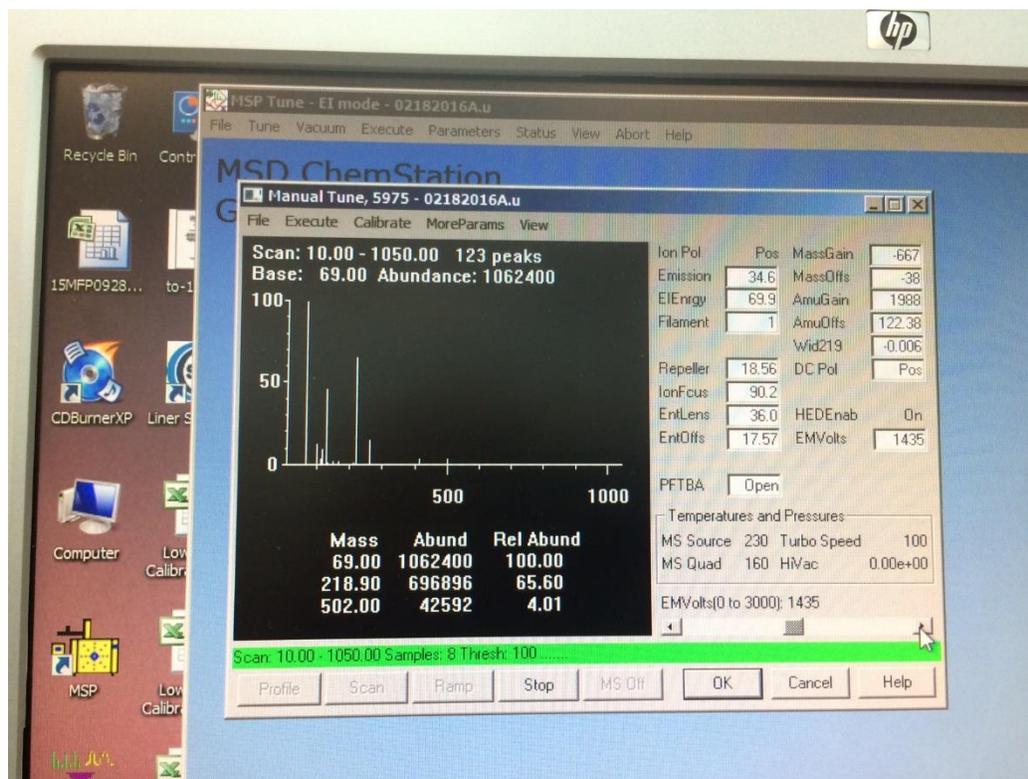


Generally, it is a good idea to check the Repeller, Ion Focus, Entrance Lens, and Entrance Lens Offset again to see that the 69 mass ion has been optimized. You should also printout each of the ramps by selecting the File option on the menu bar and then selecting Print option. It is also a good idea to keep a file of the printout of each of the optimized parameters because the curve shape should not vary with each manual tune. A change in the curve shape will indicate that the source needs tuning and/or cleaning.

The next thing that should be optimized is the sensitivity of the detector by adjusting the EMVolts by highlighting the EMVolts field. You cannot perform a Ramp on EMVolts, so press the Scan button. You should see a screen similar to the one below:



Scan provides a real time scan of sensitivity of the detector. The EMVolts should be adjusted so that the Abundance for the 69 mass ion is greater than 1,000,000 (one million). The EMVolts are adjusted the moving the EMVolt slider bar left or right, clicking the Left or Right Arrow buttons, or entering a number in the EMVolt field. Once the EMVolts have been optimized you should see an abundance of a least 1,000,000 for the 69 mass ion.



After optimizing the Repeller, Ion Focus, Entrance Lens, and Entrance Lens Offset to maximize the 69 mass ion and adjusting the EMVolts so that the 69 mass ion has an abundance of at least 1,000,000, save the tune file and return GC MS control window by closing the Manual Tune window and selecting the View option on the menu bar.