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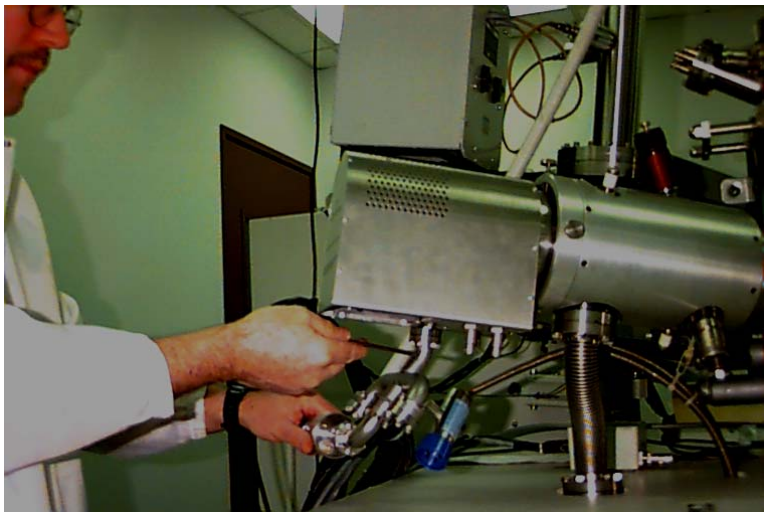
Duoplasmatron Rebuild Procedure.

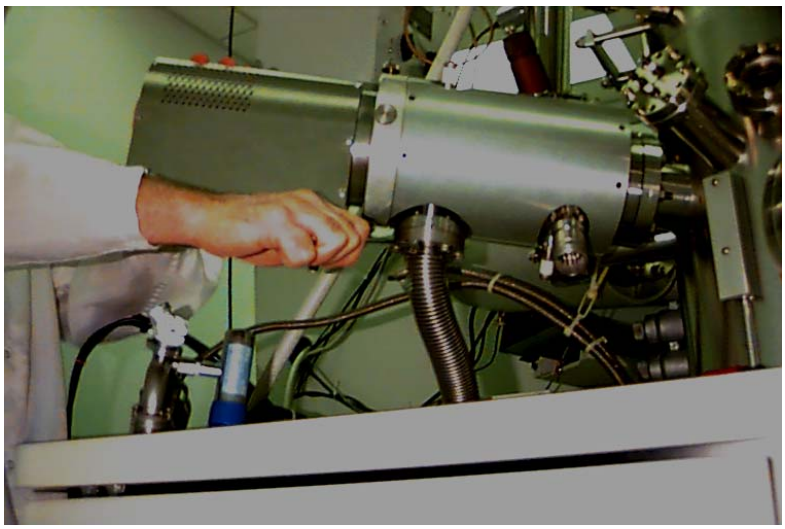
Overview

This procedure will help you to rebuild your PHI 06-660 Duoplasmatron ion source. On older ion columns the system needs to be vented before beginning this procedure. On newer ion columns there is a needle valve which allows the source to be removed and rebuilt with out venting the system. This example is the older style ion column.

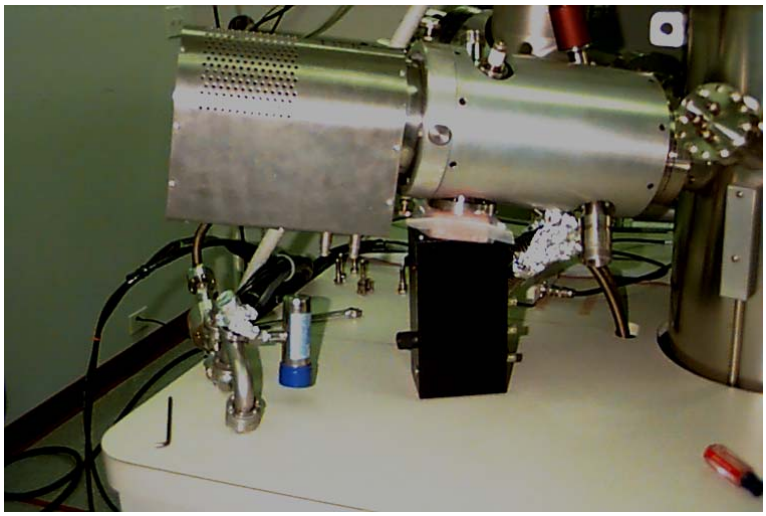
1. After venting the system, remove the gas manifold at the source. Protect the knife-edge with aluminum foil.



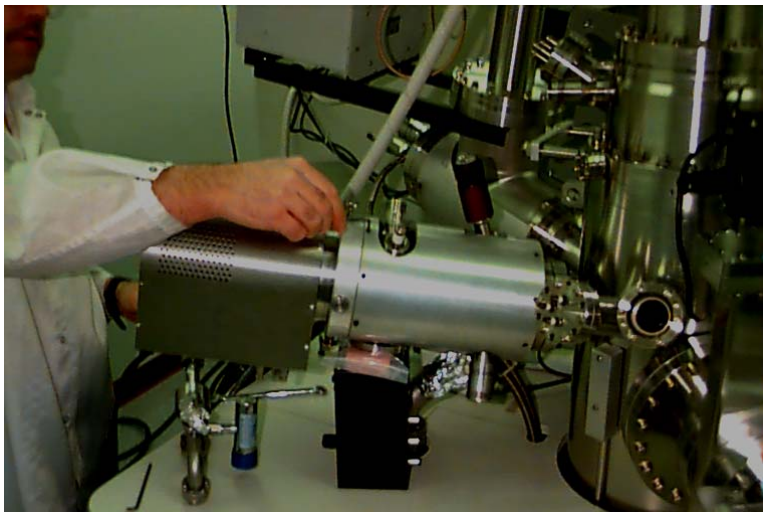
2. Disconnect the differential pumping line. Protect the knife-edge with aluminum foil.

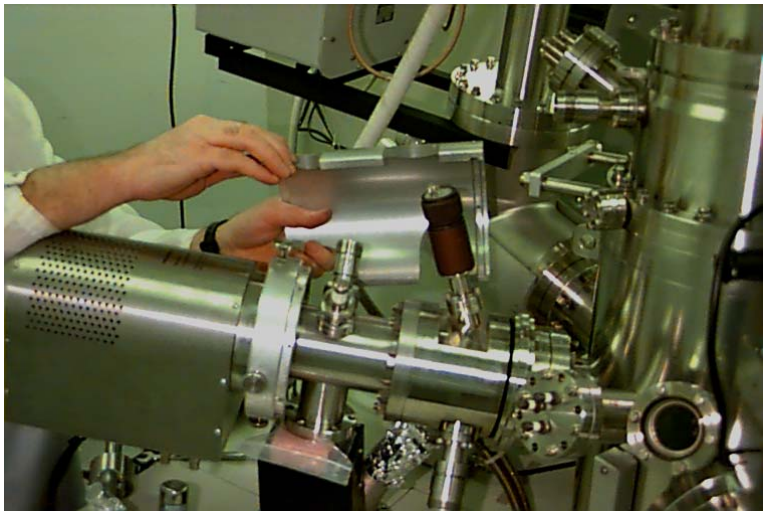


3. Support the differential pumping port with some solid object. Use aluminum foil to protect the knife-edge from becoming damaged. The reason that this needs to be supported is so that when the alignment collars are removed from the column the bellows plate will not be supporting the total weight of the ion gun. If this happens, the bellows plate may develop a vacuum leak.

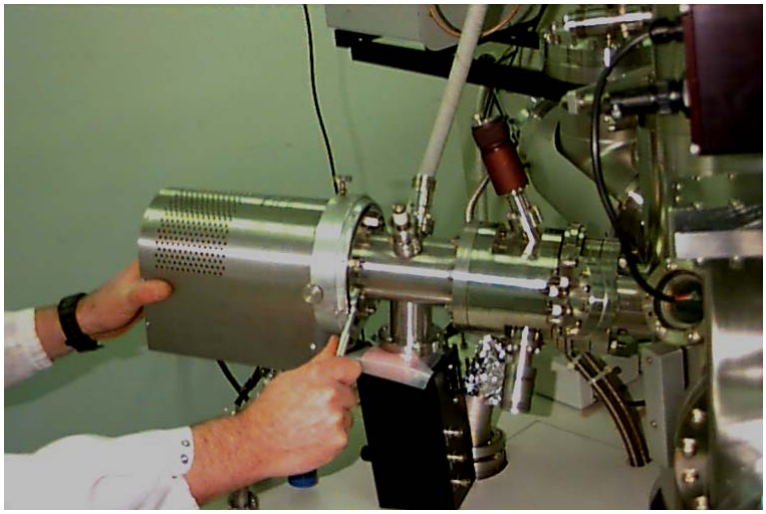


4. Remove the alignment collars by first removing the screws which hold the collar to the ion gun column. Be very careful when pulling the halves of the collar away from the COND and OBJ high voltage feedthrus.

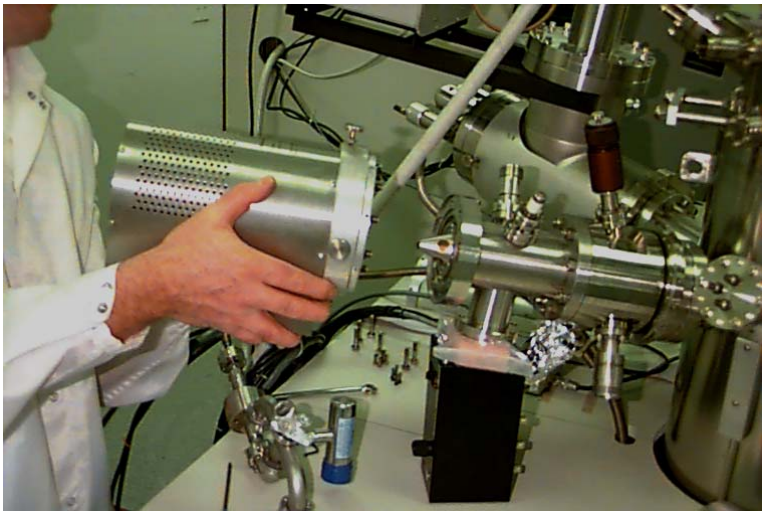




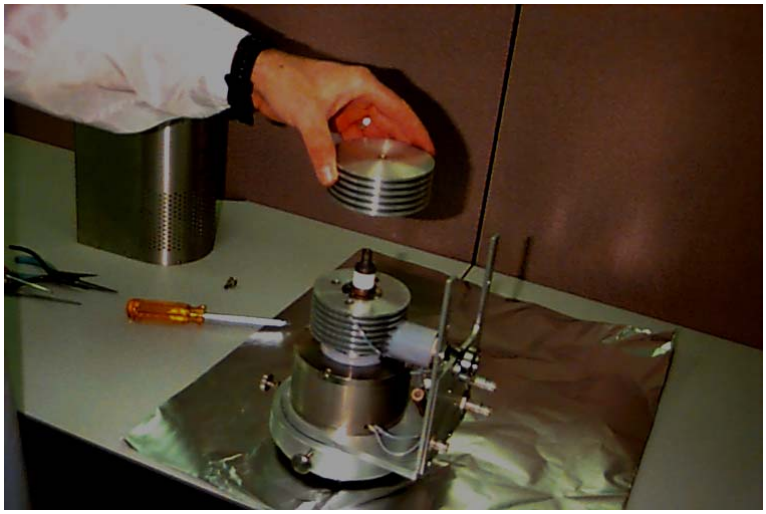
5. Remove the 8 ½” hex nuts, which fasten the source to the column. Be careful to support the source when you remove the last nut.



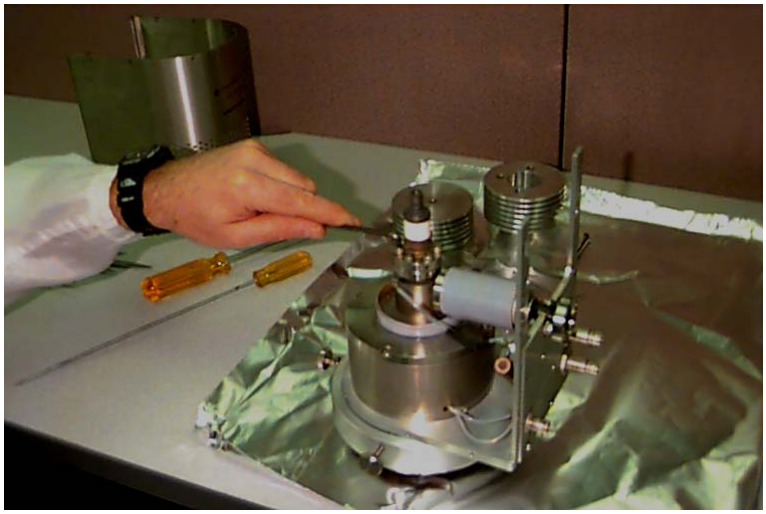
6. Carefully remove the source from the column.



7. Prepare a work area and cover it with clean aluminum foil. Place the source on the work area and remove the outer shield. Remove the top heat sink.

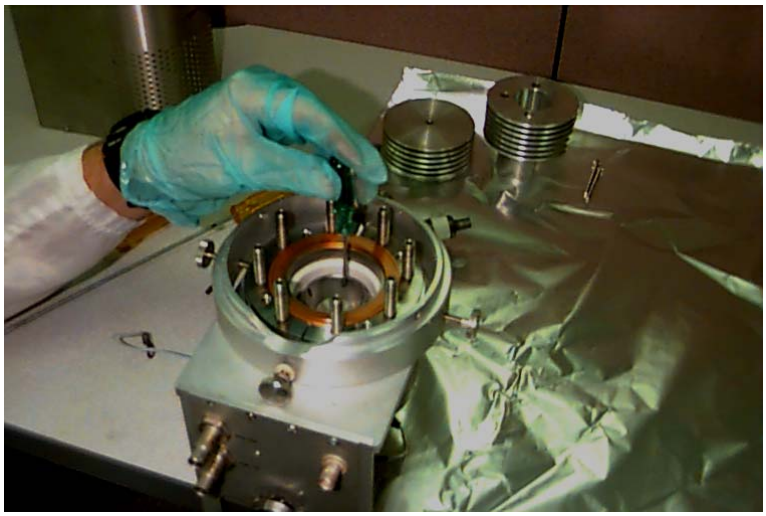


8. Remove the second heat sink (3 screws) and the 6 screws, which fasten the cathode ceramic to the source housing.

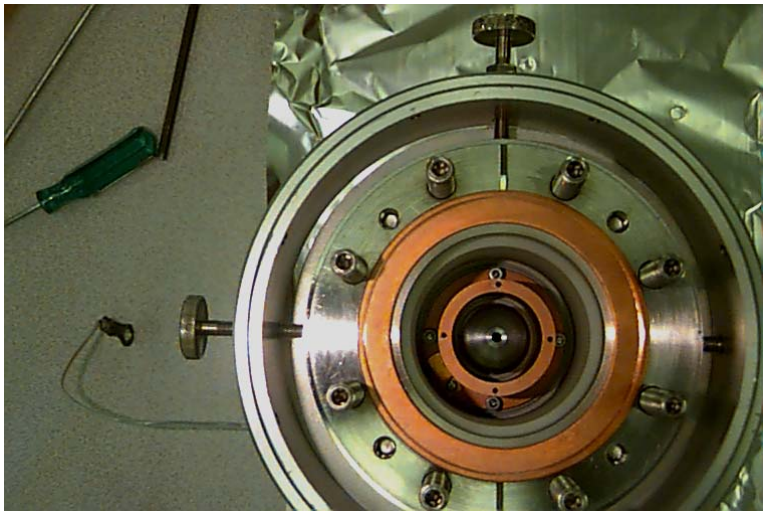


9. Remove the cathode ceramic by lifting it straight up. Tip: make a lip on the edge of the aluminum foil to capture the red sapphire beams which will fall out when the cathode ceramic is removed. These sapphire beads insulate the cathode from the intermeditate electrode (You can clean the nickel off of these beads with a small amount of diluted nitric acid and re-use them if you have access to a chemistry lab).

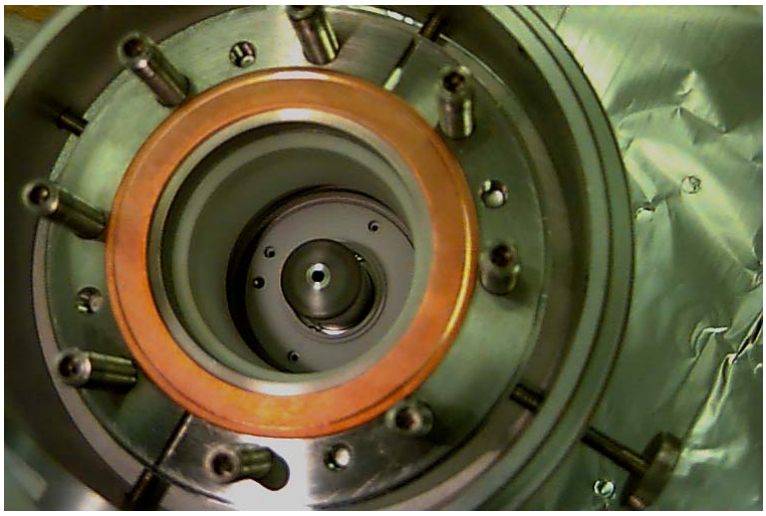
From This point on use gloves and clean tools.



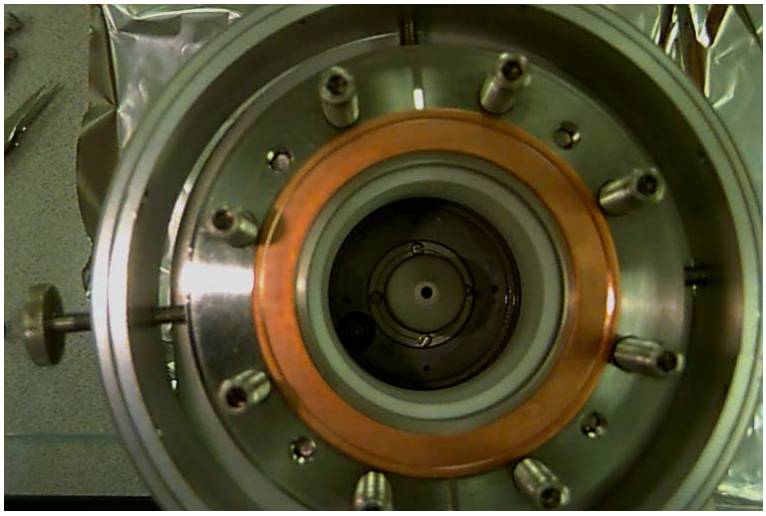
10. Turn the source over and remove the 4 screws, which hold the anode to the anode support housing. Use pliers to lift the anode out.



11. Remove the 4 screws (also the washers and ceramics) that hold anode support to the base of the source. Use a needle nosed pliers to lift the screws and washers out.



12. Remove the ceramic at the base of the source. Use a long needle nosed pliers, being very careful not to drop the ceramic.



13. Remove the 4 screws, which hold the intermediate electrode to the base of the source and lift out the intermediate electrode.

14. Install the new intermediate electrode to the base of the source. Make sure it is clean. If uncertain about the cleanness of the parts, ultra-sonically clean them in methanol and then isopropanol followed by drying.

15. Replace the ceramic at the base of the source.

16. Set the anode support on top of the ceramic. The spring tab should line up with the electrical feedthru.

17. Set the ceramics back into the anode support. Using pliers, place the washers and screws inside of the ceramics. Tighten the screws to attach the anode support to the base of the source.

18. Replace the anode aperture (in the center of the anode), but punching out the old one and tapping the new one in place. The spiral-grooved side should face down (towards the anode support).

19. Replace the anode; tighten the four screws, which hold it to the anode support.

21. Turn the source over and set it on top of the tabletop (so that is sits flat).

22. Remove the old cathode from the cathode ceramic by pulling it and turning it counter clock-wise. There is a screw in the base that should loosen up. If not, use a long Allen wrench to un-screw it.
22. Install the new cathode to the cathode ceramic, using a new screw to hold it in place.

23. Place a new gasket 1.33” copper gasket on the knife-edge. Slide the cathode past the copper gasket, placing the red sapphire beads into the slots as you lower the cathode. If you are having problems doing this you can drop the beads in a small amount of methanol. The capillary action will hold the beads in place while to lower the cathode.

24. Tighten the cathode screws in a circular manner until the cathode is sealed.

25. Replace the heatsinks and cover.

26. Reverse the removal steps to place the source back on the ion gun column. Very Important: Remember to place the alignment collar ring on the source before you replace the source on the column.

END OF PROCEDURE