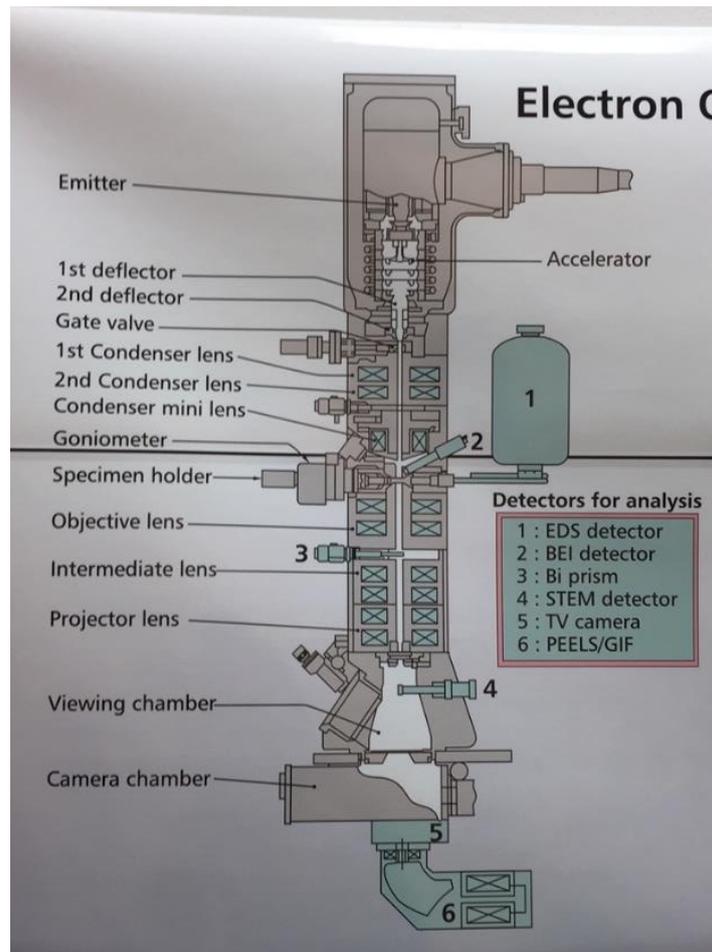


# TEM JEOL 2100F



Starting procedure:

1. Check if water levels are ok:



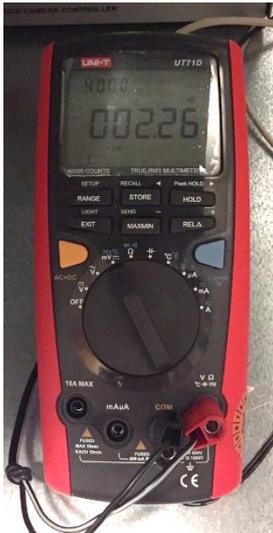
2. Check cooling water 10 °C (inflow) and  $\pm 14$  °C (outflow) on the wall, (the values are somewhat different, i.e. higher in summer)



3. 19C on the cooler
4. Check that ion getter pumps: all lamp green, GUN pumps are about 0, Column pump in the left half



5. Switch on voltmeter for pressure measurements on mV and press SEND (mixmax) until pips
6. PC under the microscope are always on
7. TEMCON software (always on): Press circle arrow if red (to reset the connection)



8. Gatan camera right PC monitor ON
9. P vacuum: check should be less than  $2,5 \cdot 10^{-5}$  Pa, if  $< 1 \cdot 10^{-5}$  Pa it is good (the vacuum is better in winter and becomes somewhat worse in summer)
10. Write P value to the notebook on the PC
11. Gatan Digital software on  $\Rightarrow$  2 pips (control ok), error comes it is ok.
12. T on the camera should go down and reach about 10C
13. **Fill nitrogen, first small amount, and wait a bit, it will splash a bit, then comes a cloud and then fill more. If filled full it should be good for 6 h.**
14. Software HT  $\Rightarrow$  Emission current 116-126  $\mu$ A. If not go to Emission and change emission (Filament value)
15. Stage position neutral, z in range [-200,200]  $\mu$ m
16. When start have 20x MAG
17. Alignment file alignment\_200kVTEMSTEM10.01.19 or the last one.
18. Vacuum at PEG1  $20-23 \cdot 10^{-3}$ , PIG1  $< 20$ , PIG4  $< 40$ , when all is on, PIG3  $< 35$
19. Insert TEM holder, PIG4  $< 40$  and Green on (Pump air)
20. Beam on (it opens the valve)



## Beam alignment

1. Beam center: GUNA (Gun alignment) Spot 1, brightness to a spot, press F4 and center using SHIFT X&Y (Spot 1-5, 1 more bright, bigger current). Alpha 3
2. Then BRIGHT TILT, spot 5, center with SHIFT X&Y, repeat step 1 and continue until GUNA and BRIGHT TILT both centered
3. Condenser aperture in and center the aperture
4. Gun Tilt: ANODE WOBBLER (F3), if beam contract/expand not concentrically-GUNA-F4, and with DEF/STIG X&Y adjust
5. Do steps 1-2 again-beam centering
6. Z height: press STD FOCUS, activate IMAGE WOB X or Y, press Z up and down to see when the image stops wobbling
7. HT center: expand the beam, find a good feature, turn HT WOBBLER, adjust with Bright Tilt and DEF X&Y, then adjust beam with Shift X&Y
8. **TILT compensation?**
9. Objective aperture in: align with condenser aperture. Do it at MAG 6000X

### **Condenser stigmator check:**

1. Use the BRIGHTNESS control to make the electron beam small.
2. Adjust the size of the beam by turning the BRIGHTNESS control clockwise or anticlockwise from the smallest point.
3. The shape of the beam should remain circular for both directions of rotations.
4. If not STIGMATION is wrong.
5. To correct the CONDENSER STIGMATION, select COND STIG button from the left-hand control panel.
6. Use the DEF/STIG X and DEF/STIG Y knobs to adjust the shape of the beam.
7. BRIGHTNESS is adjusted either clockwise (less brightness) or anticlockwise (more brightness) from the smallest beam. If you have a beam spot and turn BRIGHTNESS further anticlockwise, the brightness decreases, too. Then you are on the WRONG SIDE of the cross over which is really not good!!)
8. Turn off COND STIG by pressing the button again (the light in the button will go off).

### **Imaging**

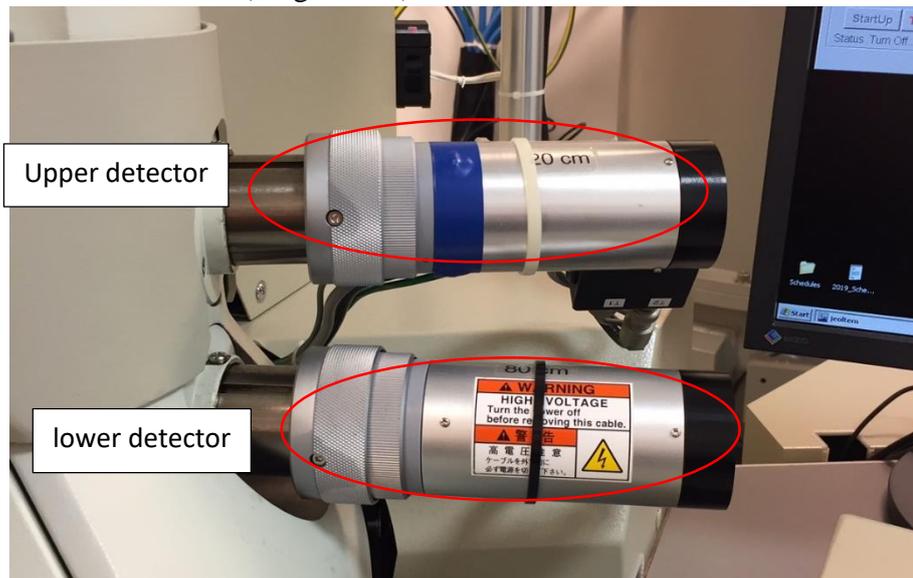
1. Insert the camera, start life
2. For the transmission camera: lift the screen F2.

### **When finished**

1. Stage neutral
2. MAG 20k
3. Spread the beam
4. Put the heater plug in,
5. Choose Maintenance, ADC on

## STEM

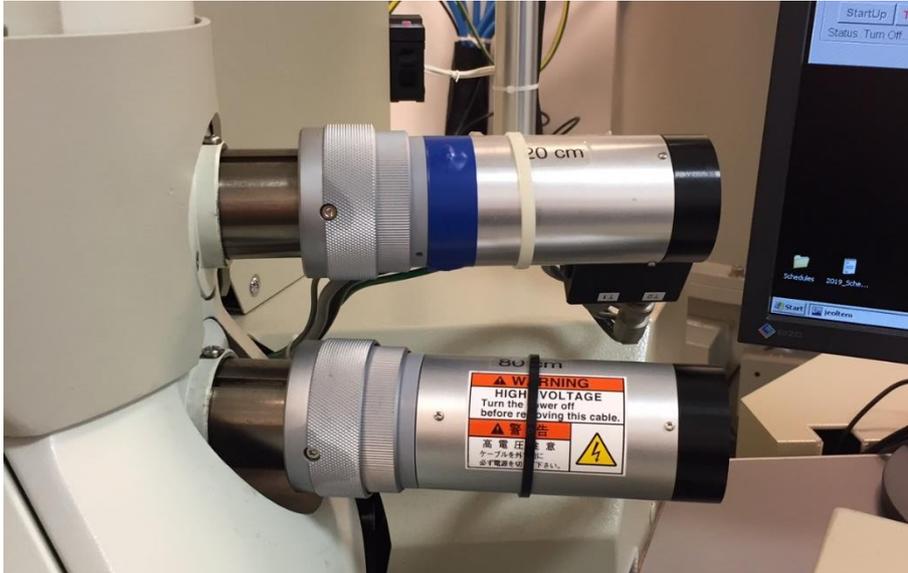
1. For STEM mode both apertures out
2. MAG 20K
3. Start software: JEOL simple viewer
4. Dialog=> asid control, on ASID choose spot, SND FOCUS 1 sec
5. Focus through your sample to obtain a ronchigram, make it round by using Condensor Stigmator in combination with DEF/STIG and center it using PLA and DEF/STIG knobs
6. Aperture 3(Condenser), step by step align and adjust
7. Focus to find a sample, ronchigram
8. Down detector in (Bright field)



9. Up detector in (Dark field)
10. (camera length 80 down, 20 up)
11. STEM detectors out, go to TEM mode
12. Open Jeol Simple Viewer program
13. Take images
14. Align condenser etc

## EDX

1. For STEM mode both apertures out
2. MAG 20K
3. Start software: JEOL simple viewer
4. Dialog=> asid control, on ASID choose spot, SND FOCUS 1 sec
5. Aperture 3(Condenser) , step by step
6. Focus to find a sample, ronchigram
7. Down detector in (Bright field)



8. Up detector in (Dark field)
9. (camera length 80 down, 20 up)
10. INKA operator on the left PC
11. INKA software on
- 12. Close beam**
13. Oxford Detector IN: optionen, Detektorsteuerung=>in



- 14. Beam on**
15. Choose either STEI-BF or STEI-DF for detection
16. Set sitelock in Bildvorgabe
17. Choose area to take a mapping
18. Smart map, start (Cu and Si can come from the device)
19. At least 200.000 counts,  $10^6$  counts or more are better!!
20. When EDX is done. Beam off

21. Detector out
22. Beam on
23. choose "Detector none" in ASID CONTROL
24. STEM detectors out, go to TEM mode
25. Align condenser etc