HIGH RESOLUTION FIELD EMISSION
SCANNING ELECTRON MICROSCOPE: HITACHI S-4800

BEAM ALIGNMENT PROCEDURE

1. Set V_{acc} and I_e to desired value.

2. Move stage to desired working distance with **Z** manual knob on sample chamber. The distance is in mm; this is the distance between the pole piece and the sample surface.

3. Under the **SEM** tab in the software interface, set **WD** (working distance).

4. Select focus mode **UHR**.

5. Press **F2** on the keyboard while the cursor is over the view window to degauss the objective lens. This should be done every time focus is greatly changed (by changing working distance), or V_{acc} or I_e are changed.

6. Adjust **FOCUS**/**BRIGHTNESS**/**CONTRAST** knobs to obtain the best image possible.

7. Check that I_e has not dropped from selected value. If it has, press **SET**.

8. Click **Align** button along top row of screen to open align dialog box.

   Note: In general you want to align the beam at twice the magnification that you will be using for your images.

9. Align beam:
   a. Click the **Beam Align** radio button.
   b. Adjust **BRIGHTNESS**/**CONTRAST** knobs to obtain a clear disc. Use **STIGMA/ALIGNMENT** knobs **X** and **Y** to center disc on the target.

10. Align aperture:
    a. Click the **Aperture Align** radio button.
    b. Use **STIGMA/ALIGNMENT** knobs **X** and **Y** to minimize motion in image.

11. Align Stigma Align.X and Stigma Align.Y:
    a. Click the **Stigma Align.X** radio button.
    b. Use **STIGMA/ALIGNMENT** knobs **X** and **Y** to minimize motion in image.
    c. Repeat for **Stigma Align.Y** radio button.
12. Select **Off** radio button to turn off alignment functions.

13. Adjust **FOCUS** knobs for best image.

14. Correct lens astigmatism by adjusting **STIGMA/ALIGNMENT** knobs **X** and **Y** knobs for best image.

    When the astigmatism is out of adjustment, the image will be “smeared”. Round objects will appear oblong. Adjust **STIGMA/ALIGNMENT** knobs **X** and **Y** so that this “smearing” is minimized.

15. Repeat (14) and (15) until best image is obtained.

16. In some cases the initial focusing done in (7) would not have produced a quality image suitable for the alignment in (9) to (13). If this was the case, after (16) go back to (9) and repeat the process.