Steering beam from G-line to E-line

	Undulator	diamx	diamz	Diamchi	diamth	date
G-line	7.450	-0.8500	-16.2500	1.7980	16.454	2009.11.09
E-line	7.460	-0.3750	+16.16	1.8573	26.5806	2009.11.16

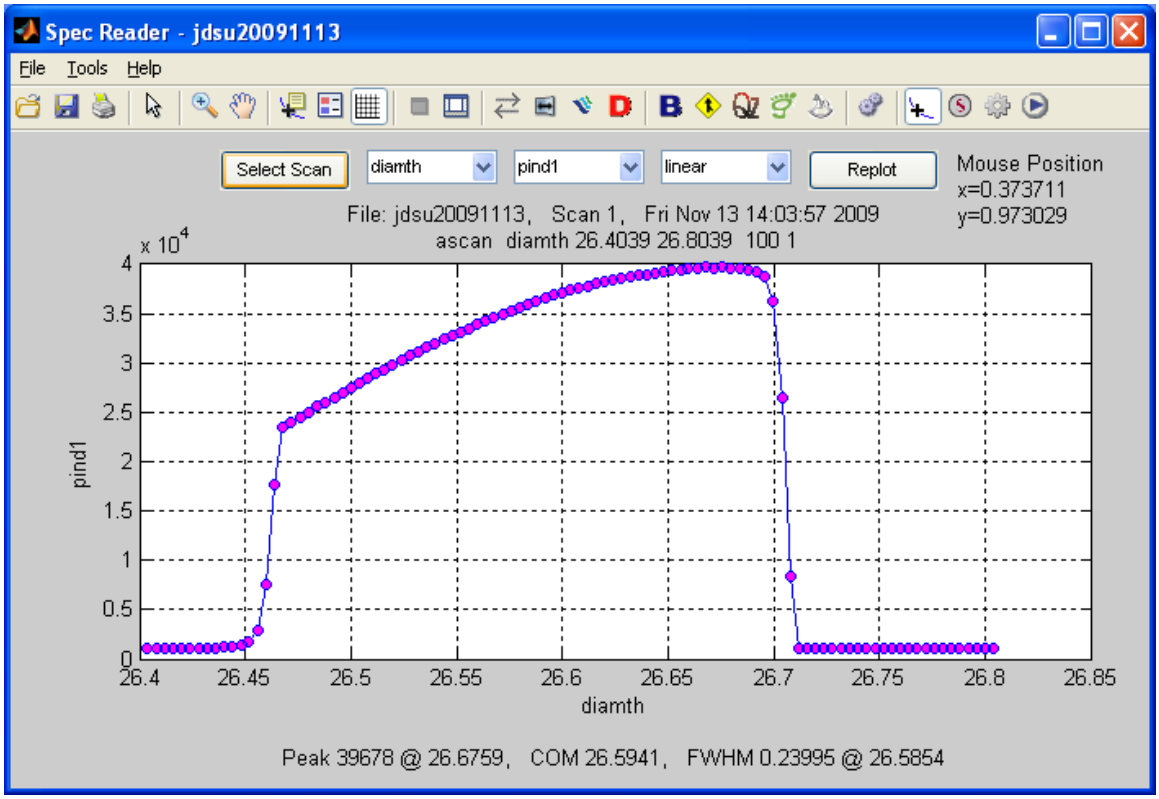
1. At the I-station, optimize the position of diamx as viewed in pind1 on the I-line according to the procedure posted in the Elog (message ID # 266, "Checking diamx position after shutdown").
2. Log into the E-station terminal as 8ideuser. Start spec (fourc8IDE) and start a new file (newfile). Start EPICS (start_epics). Swap the coax cables for the LED readouts over the E-station terminal so they are reading pind1, pind2 for the E-line.
3. At the E-station, make sure Spec is configured so that motors diamz, diamth and diamchi are enabled. At the spec prompt, type:
    a. > config
    b. > touch space key or Enter to continue
    c. Use arrow keys (← →)to select motors
    d. Disabled motors will show "NONE" in the field labeled "Number: <>Controller"
    e. To enable a motor, use arrow keys(↑↓) to move to the "Number: <>Controller" field, then the + sign to get a menu of available types. Use the arrow keys to highlight "EPICS_M2" and then the Enter key.
    f. When all the motors are enabled, type "w" to save the changes. A dialog box appears, ignore the warnings and enter "y" to confirm
    g. Enter Control-C to quit configuration mode.
4. Move diamz from the position for the (111) crystal [diamz = -16.25] to the (220) crystal position [diamz = +16.16]
5. Coarsely steer beam into the E-line.
    a. Open up the upstream slits se1 to 10000 μm (H) x 5000 μm (V).
    b. Move diamth to the desired position, 26.6037. Diamth position is the Bragg angle for the crystal, (111) for G-line or (220) for E-line, and the energy 7.350 keV, plus an offset that should be the same for both angles. The angles can be calculated using the applet "Daniel's Crystal Calculator" available on the CHESS website:

    http://www.desy.de/~luebbert/CrystalCalc.htm

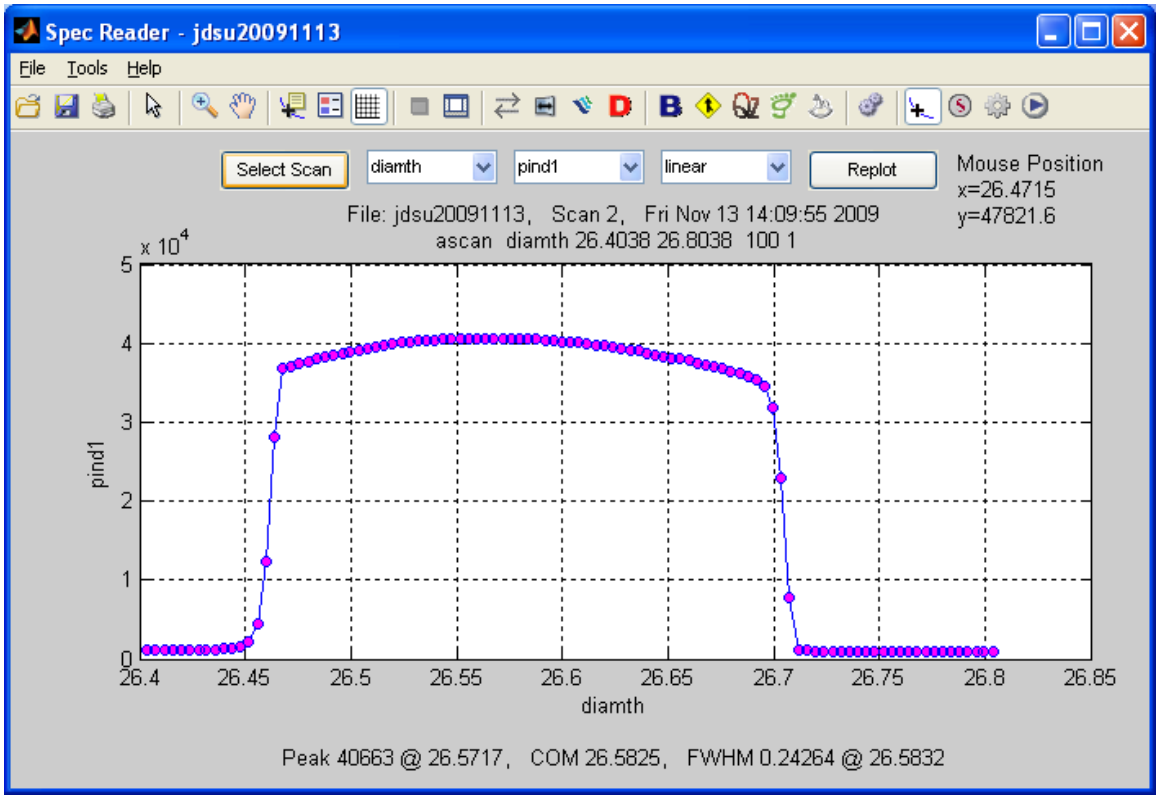
    or follow the link from the 8-ID website under Operations and Schedules/Useful Links

    For 7350 eV, Bragg(Si 111) = 15.604°; Bragg(Si 220) = 26.057°. Note that the undulator is detuned +100 eV relative to the monochromator energy, so the undulator is set for 7.450 keV.

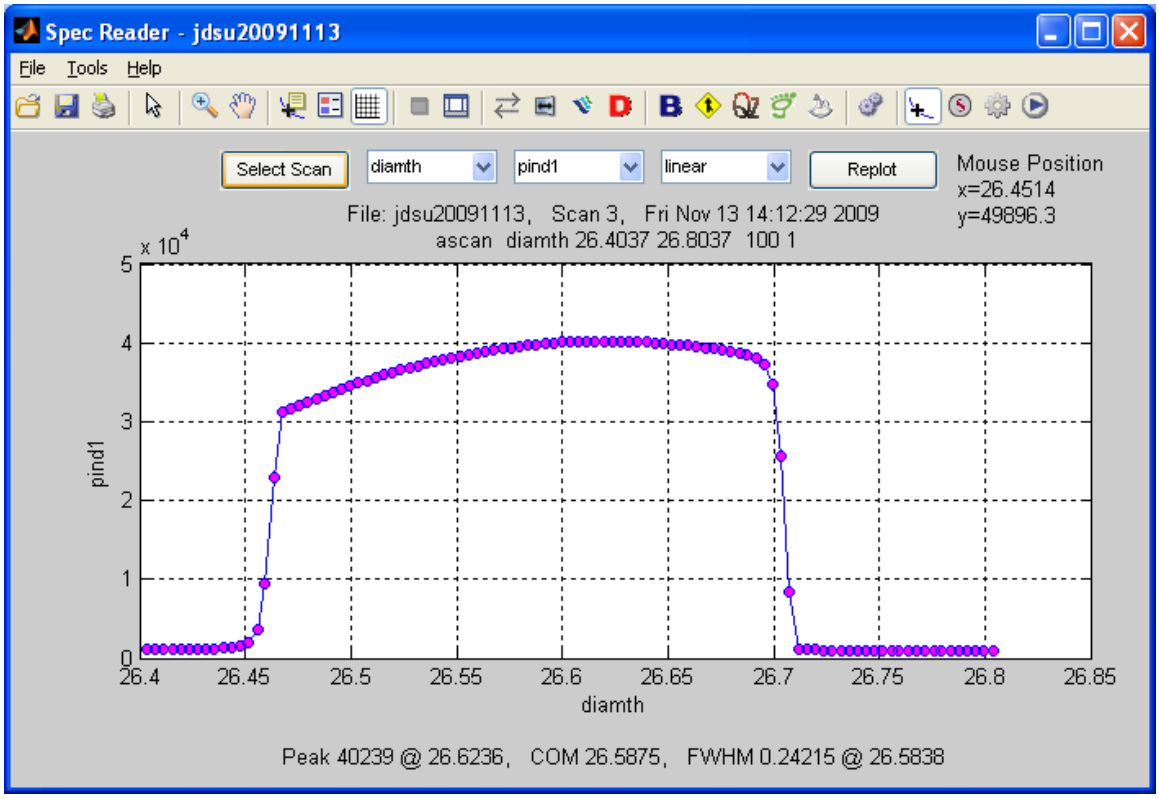
    c. Scan diamth, tweak the undulator energy to get peak of monochromator output centered in aperture, as shown in figures below.



Above: Initial position, undulator = 7.450 keV, monochromator output not centered in aperture.



Above: Undulator = 7.465 keV, monochromator output peaked towards the left.



Above: Final position, undulator = 7.460 keV, monochromator output peaked towards the right – good enough.

   d. Optimize flux in pind1 by tweaking diamchi.
   e. Benchmark value: for se1vgap = 100 μm, se1hgap = 100 μm, get flux of 4e+10 ph/sec.

6. Adjust beam position finely, assuming that downstream slits, se2, are in the correct position:
   a. Position PIN diode behind se2 for use as monitor pind2.
   b. Open upstream slits, se1, 5000 μm x 5000 μm
   c. Keep se2 at desired opening and position.
   d. Optimize flux in pind2 by tweaking diamth and diamchi.
7. Enter Spec config mode and disable the motors diamz, diamth and diamchi. Follow the directions above, but change the motor type from "EPICS_M2" back to "NONE". Save the changes and exit configuration mode.