<u>Alignment of Nanoprobe mirror system</u>

Jörg Maser, Oct. 4, 2008
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Caution:

1) Always begin with M1X1 at -1.0 mm (i.e. in its inboard position, with only the downstream side of M1a exposed to beam).
2) Always align with open gap (30 mm or larger)
3) Never chose a grazing angle of less than 2.0 mrad

1) Set ID gap to 30 mm

2) Move M1X1 to -1.0 mm, M1X2 to +1.88 mm (θ = 2.4 mrad)

3) Check vacuum: should be low 10**-8 torr

4) Open white beam slit (WBS) to:
   - WBS_h_center = 0.0
   - WBS_h_size = 2.2
   - WBS_v_center – 0.0
   - WBS_v_size = 0.5 mm

5) Verify horizontal centering of WBS by looking at the white beam (upstream diamond screen, "Video 1") by closing H_size and looking for horiz. symmetry

6) From its most inboard position (M1X1 = -1.0 mm, θ = 2.4 mrad), move M1X1 and M1X2 in 0.1 mm steps outboard until double reflected beam is visible in pink beam ("Video 2"). M1X1 and M1X2 must be moved together in fixed increments to maintain fixed grazing angle, and prevent illumination of the upstream part of M1a.

7) Monitor inboard edge of pink beam. Mark inboard edge as soon as doubly reflected pink beam is visible.
   - If the inboard edge moves outboard when M1X1 and M1X2 are moved together, the inboard side of the mirror is shadowed by a mask

8) Center M1a on incident beam. This is done by moving M1X1 and M1X2 together outboard (positive), and closing WBS_h_size periodically around its center. If both WBS blades cut into the both borders of the pink beam, the beam is centered, and proceeding with outboard motion should stop.

9) When the mirror system is centered horizontally with regard to the center of the beam, once more verify that both WBS blades cut into both sides of the beam.

10) Position WBS to by 0.1 mm INSIDE the accepted beam, i.e. let both blades cut into the edges of the pink beam by 0.05 mm

11) Close gap to desired position