

beamline layout considerations 11/06/01

G-layout.mcd

fixed parameters

d-spacing of multilayer (A) d := 24 separation between the beams (mm) Δh := 200

notation: y (m) distance from the source

L (m) length of x-ray path

z (mm) beam height

thi (mrad) incident angle of mirror

thM (mrad) bragg angle of multilayer

thB (deg) Bragg angle of G2 crystal

multilayer movements across the energy range of 7-15 keV

$$\text{thM}(E, d) := \text{asin}\left(\frac{2 \cdot \pi}{d \cdot E}\right) \cdot 10^3 \quad (\text{mrad})$$

	energy (keV)	EG1 := 10	EG3 := 11.5
source	y0 := 0	z0 := 0	
first mirror	y1 := 22.927	z1 := z0	thi := 4
G-cave front wall	yCave := 24.021	y2 := yCave + 79.4-0.0254	
first multilayer	y2T := y2 + 1.0 y2T = 27.038 y2B := y2 y2B = 26.038	z2T := (y2T - y1) · 2 · thi z2T = 32.886 z2B := (y2B - y1) · 2 · thi z2B = 24.886	thM(EG1, d) = 26.183 thM(EG3, d) = 22.767
	beam off ML1B at ML1T	z2BatT := z2B - (y2T - y2B) · 2 · thM(EG3, d) z2BatT = -20.648	
2nd mirror	y4T := 32.188 y4B := y4T - 1.5 y4B = 30.688		y2 = 26.038

*** specified locations of focal spots ***

G1 back wall yG1backwall := 38.208
G3 front wall yG3frontwall := 41.257
G2 front wall yG2frontwall := 38.361

G1: focus 1 m upstream from back wall

G3: focus 48" downstream from front wall

G2: monochromator crystal 0.5 m downstream from front wall
focus at 1.5 m downstream from monochromator crystal

yfocG1 := yG1backwall - 1.
yfocG3 := yG3frontwall + 48-0.0254
ymonG2 := yG2frontwall + 0.5

focal spots y5T := yfocG1 y5T = 37.208
y5B := yfocG3 y5B = 42.476

G2 mono y5M := ymonG2 y5M = 38.861
and focus y5S := y5M + 1.5 y5S = 40.361