

Cross-checking with Jiawei's Spring 2020 nudge dataset

- Looked at first 10 days of the run period (Jan 10-20)
 - 97 nudge events (me) vs. 8702 (Jiawei)
- Some reasons
 - Still seem to be some nudges that take place when the beam is zero (dropped in my dataset)
 - I am grouping consecutive nudges into a single event, whereas it seems that Jiawei is counting each as a separate event
- Will need to look a little closer this week to see if these two reasons account fully for the huge discrepancy

Coordinates of Coherent Bremsstrahlung

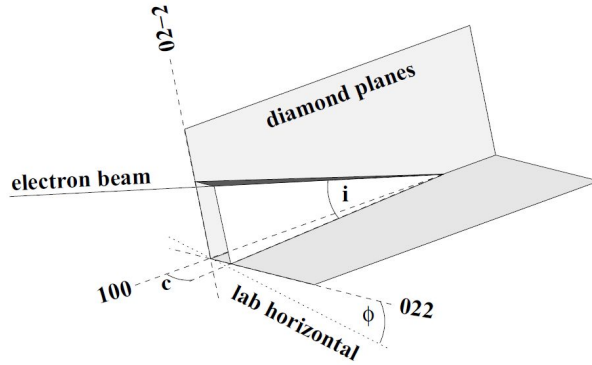


Figure 2. Illustration of the scattering angles for coherent bremsstrahlung from a diamond in the 100 orientation. The sets of planes defined by the $[022]$ and $[0\bar{2}\bar{2}]$ lattice vectors are represented by 2 single orthogonal planes.

K. Livingston, The Stonehenge technique. A method for aligning coherent bremsstrahlung radiators, *Nucl. Instrum. Meth. A* 603 (3) (2009) 205-213.

$$c \simeq \frac{k}{gE_0^2 \left[\frac{1}{E} - \frac{1}{E_0} \right]}$$

where:

$$g = \pm 2, \pm 4, \pm 6 \dots$$

E = required position of coherent edge (MeV)

E_0 = electron beam energy (MeV)

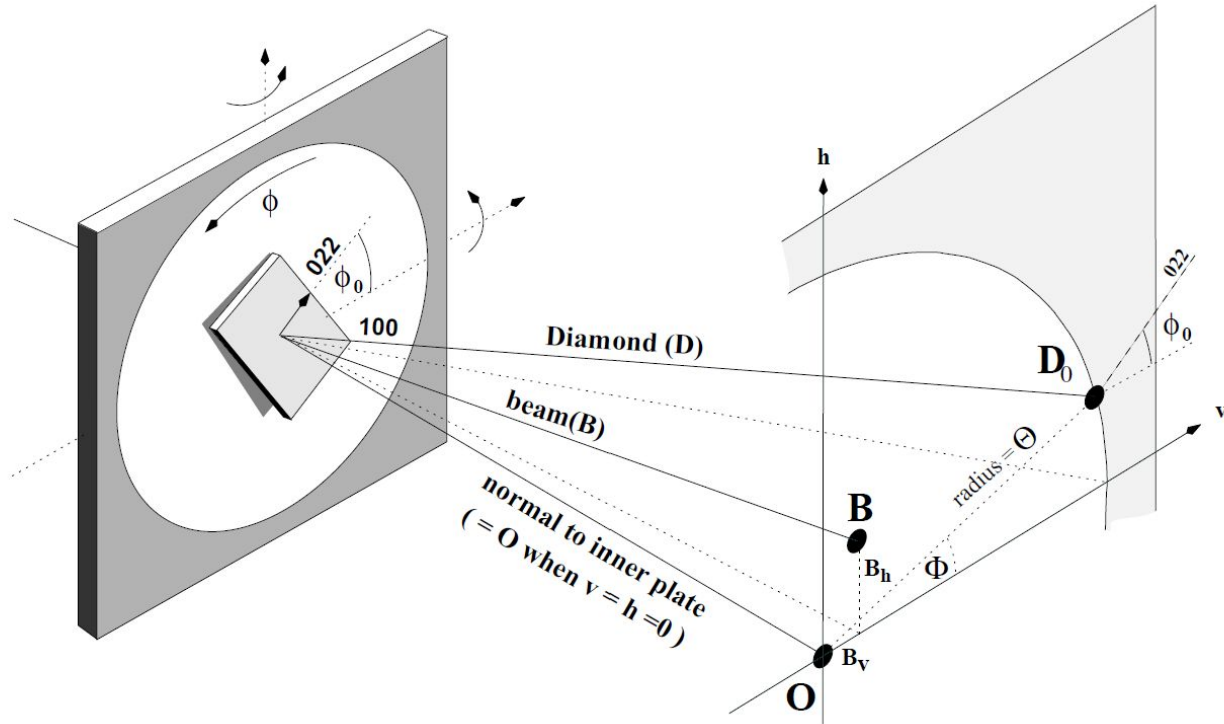
$$k = m_e a / 4\sqrt{2}\pi = 26.5601 \text{ MeV}$$

m_e = mass of electron = 0.511 MeV

a = diamond lattice constant = 923.7 (dimensionless units)

Can we map the angles in Livingston's model to the angles under our control (i.e. pitch, yaw, roll)?

Need to know offsets ϕ , B_h , B_v , Φ , Θ



Knowledge of offsets also needed for mapping the beam spot position in the diamond frame.

Offsets measured by taking $h\nu$ -scans of the diamond (Stonehenge Technique). Do we have access to the offsets from the Stonehenge plots?