PROJECT NAME SANS Data Reduction NOTEBOOK NO.

Steven Hahn caught a big error in my test of the solid-angle correction. I have revised the document, but others have not corrected it.

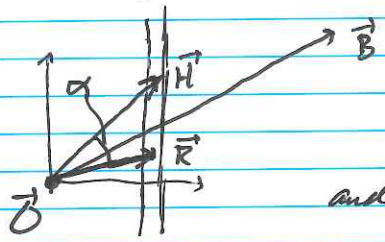
Assume that the instrument components have already been set into the coordinate system, as specified in the document. Using the notation in the document, let

$\vec{0} = \langle 0, 0, 0 \rangle$ be the sample position

$\vec{R} = \langle 320, -160, 5000 \rangle$ be where the neutron was detected (distances in mm)

Then $\vec{H} = \langle 320, 0, 5000 \rangle$ is the coordinate of the tube in the horizontal plane

Let $p_x = 4.25$ mm and $p_y = 5.50$ mm. (Changed ~~5.50~~ and ~~4.25~~ by consistent w/ last test)



$$d\Omega = \frac{p_x p_y \cos\alpha}{\|\vec{R}\|^2}$$ from the data reduction document.

and $\cos\alpha = \vec{R}\cdot\vec{H} / \|\vec{R}\|\|\vec{H}\|$

$\vec{R}\cdot\vec{H} = 320\cdot320 - 0\cdot160 + 5000\cdot5000 = 25102400$

$\|\vec{R}\| = (320\cdot320 + 160\cdot160 + 5000\cdot5000)^{1/2} = 5012.783657809 3$

$\|\vec{H}\| = (320\cdot320 + 0 + 5000\cdot5000)^{1/2} = 5010.229535660 0$

$\|\vec{R}\|^2 = 25128080$

$\cos\alpha = 25102400 / (5012.783657809 3)(5010.229535660 0)$

$\cos\alpha = 0.999490 4783$

$d\Omega = (4.25)(5.50)(0.999490 4783) / (25128000)$

$d\Omega = 9.297632 0958 \times 10^{-7}$

If the counts in the pixel are $I = 156$, then $dI = 12.489995 9968$

$I_{corr} = I / d\Omega = 156 / 9.297632 0958 \times 10^{-7}$

$\Rightarrow I_{corr} = 1.677846 5570 \times 10^{8}$

$dI_{corr} = dI / d\Omega = 12.489995 9968 / 9.297632 0958 \times 10^{-7}$

$\Rightarrow dI_{corr} = 1.343352 3577 \times 10^{7}$

These values differ from the results on pages 44-45, as expected.

SIGNATURE _____ DATE _____ 20__

READ AND UNDERSTOOD _____ DATE _____ 20__