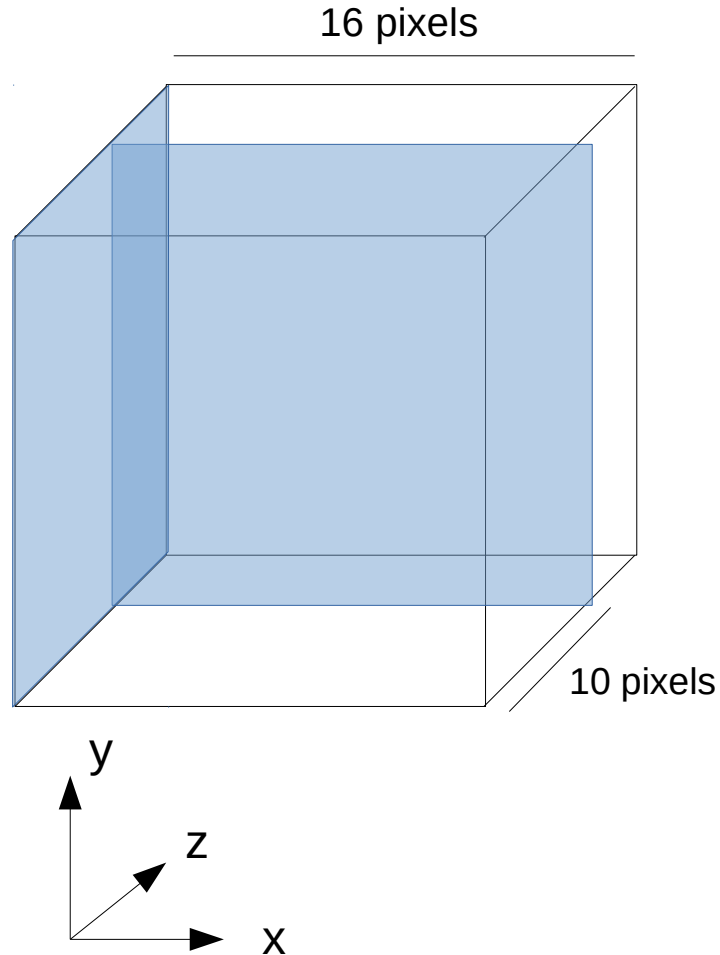


POLARIS axes & rotations

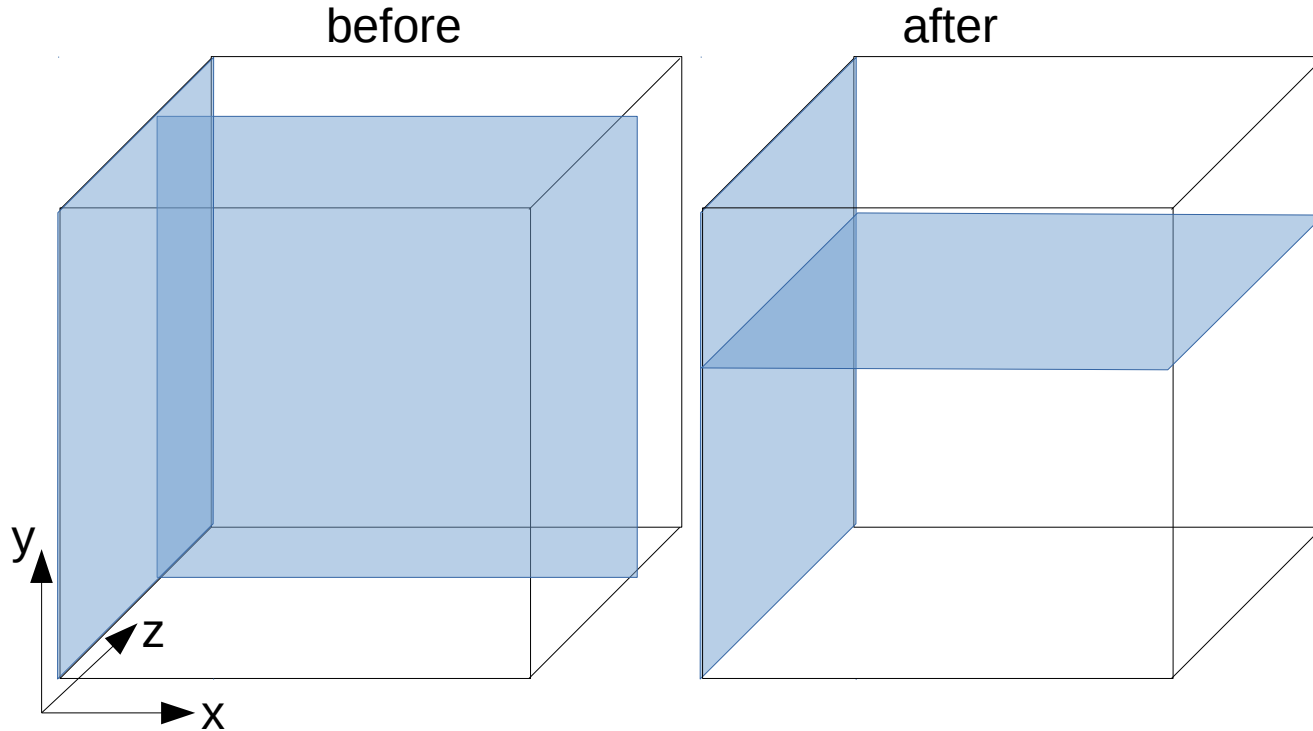
(Sanity checks)

Mock cube with constant B , n , n_{cr} , n_e



- Example tests of a 16^3 cube
- Break symmetry with slices with $n_{\text{cr}} = 0$ (at $x = 0$ and at $z = 10$) – helps identify axes at a glance
- Run octree conversion and POLARIS synchrotron emission (various detectors, i.e. observer locations)

Detector rotated around x by 90°



Commands:

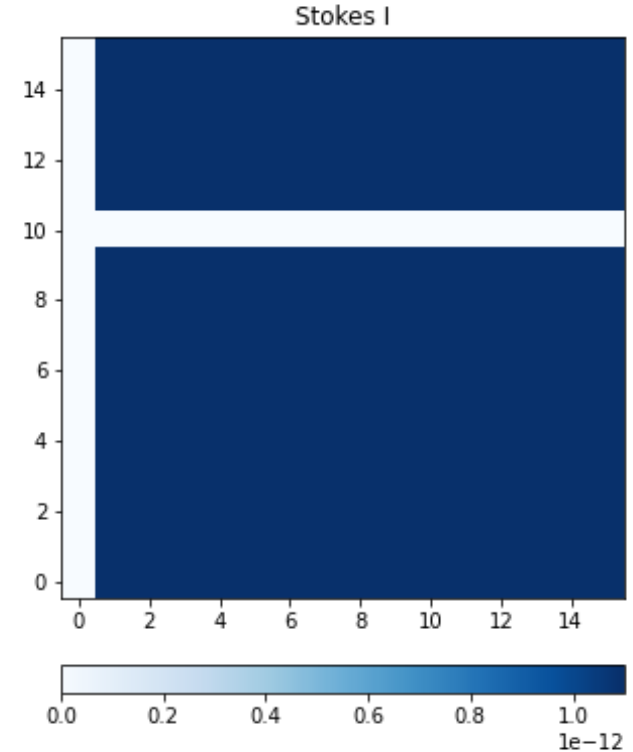
<axis1> 1 0 0

<axis2> 0 0 1

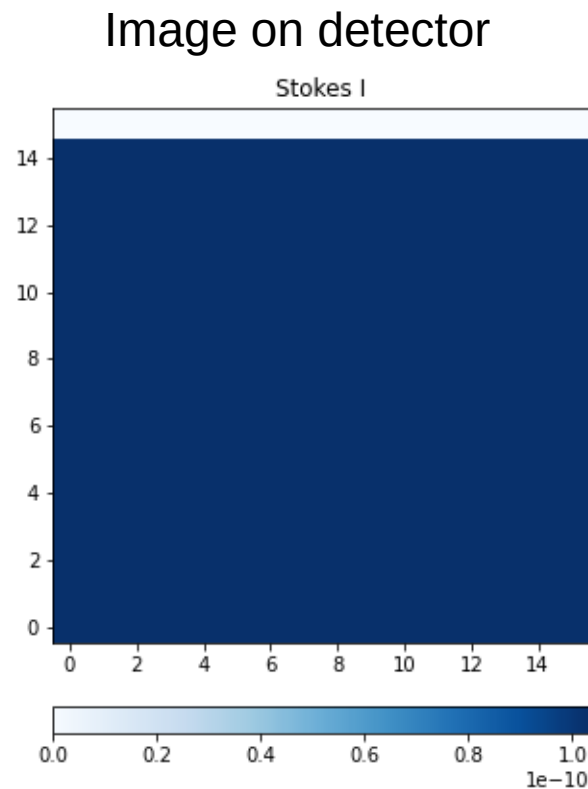
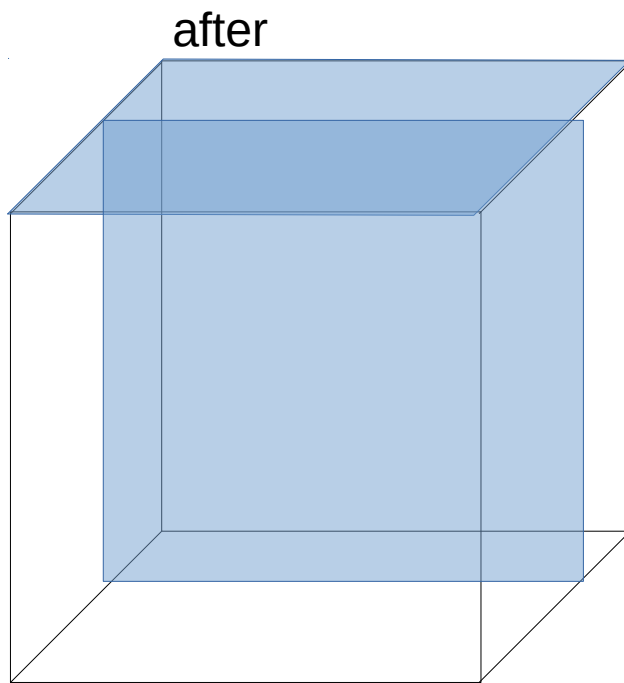
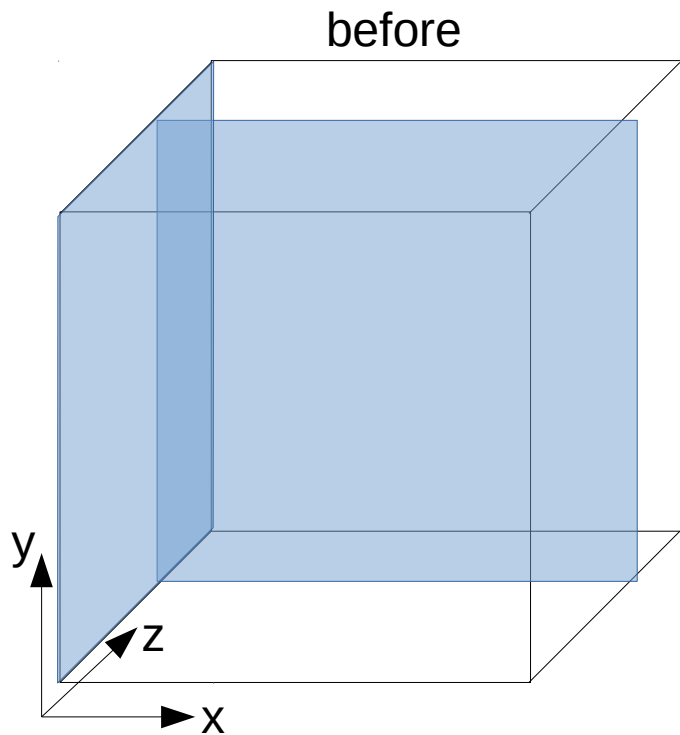
<detector_sync nr_pixel = "16">

29.9 29.9 1 1 0.0 0.0 6.0e+22

Image on detector



Detector rotated around z by 90°



Commands:

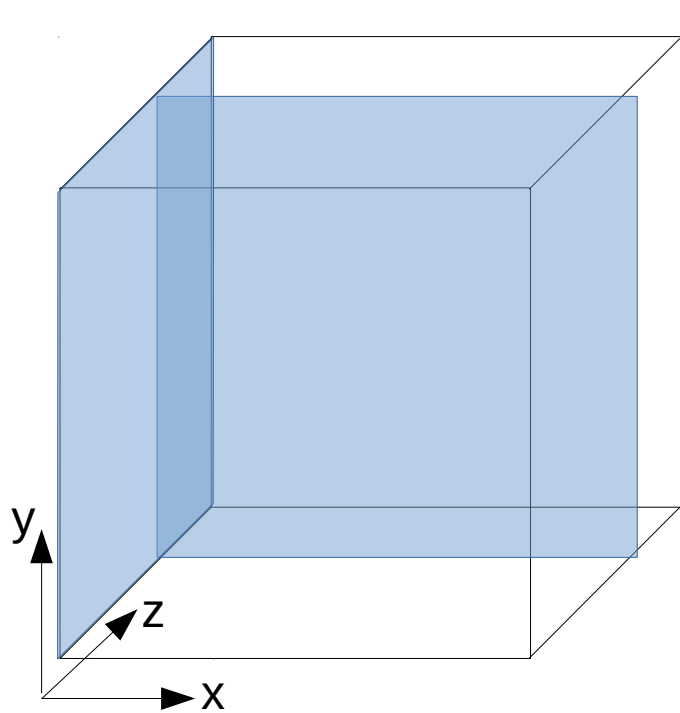
<axis1> 1 0 0

<axis2> 0 0 1

<detector_sync nr_pixel = "16">

29.9 29.9 1 1 0.0 90.0 6.0e+22

Detector rotated first around x by 90° and then around (old) z by 90°

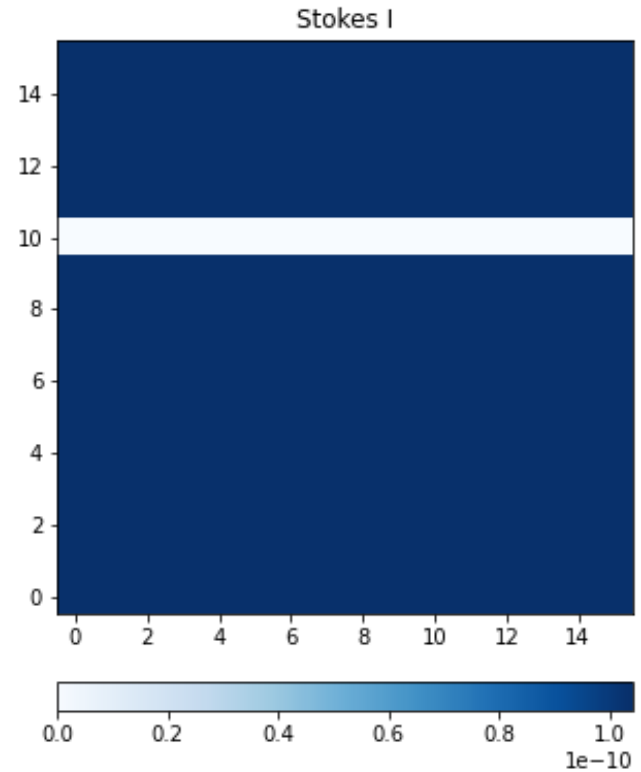
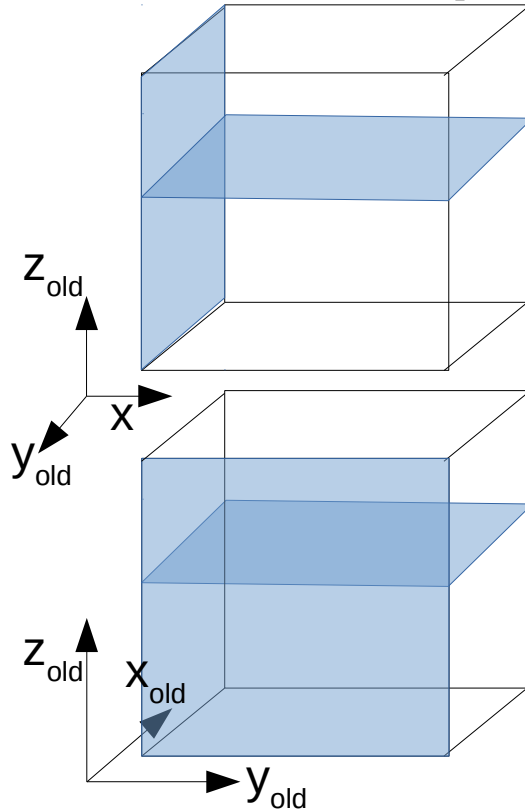


Commands:

<axis1> 1 0 0

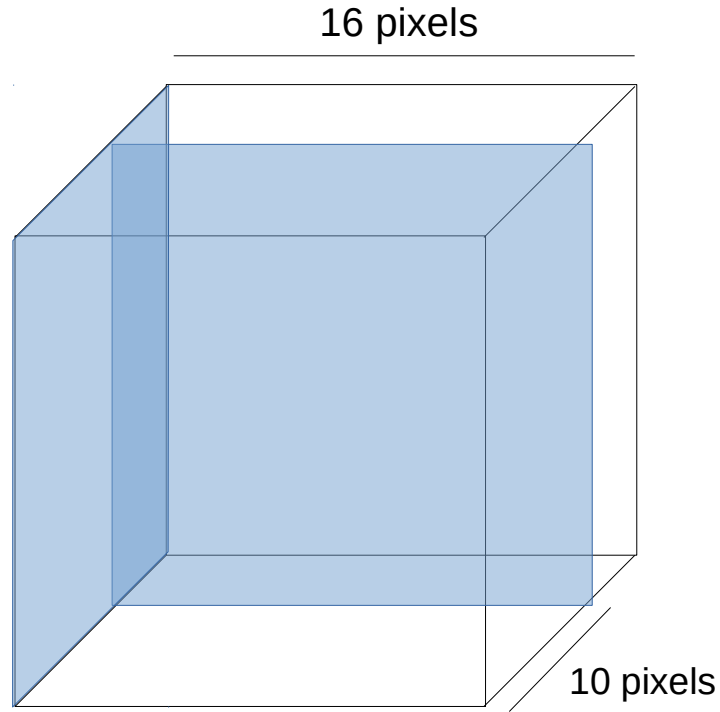
<axis2> 0 0 1

<detector_sync nr_pixel = "16">



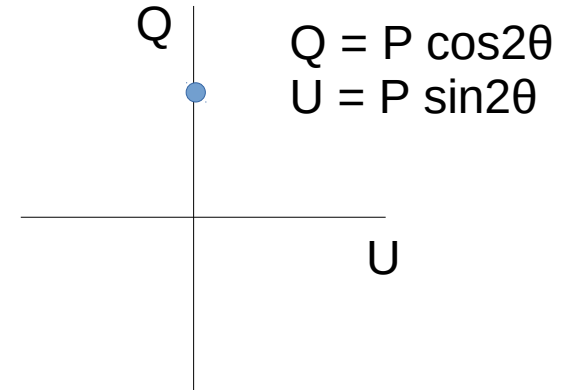
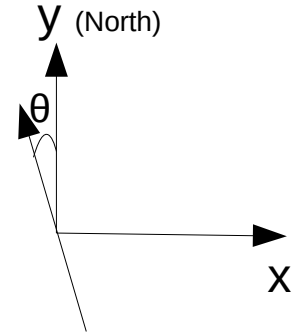
29.9 29.9 1 1 90.0 90.0 6.0e+22

Magnetic field vector

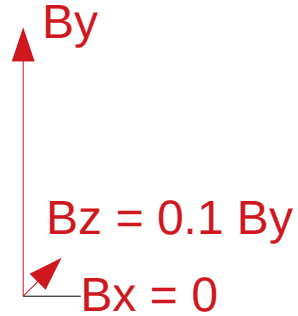
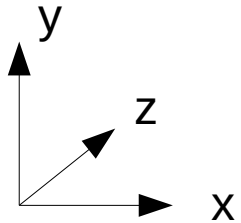
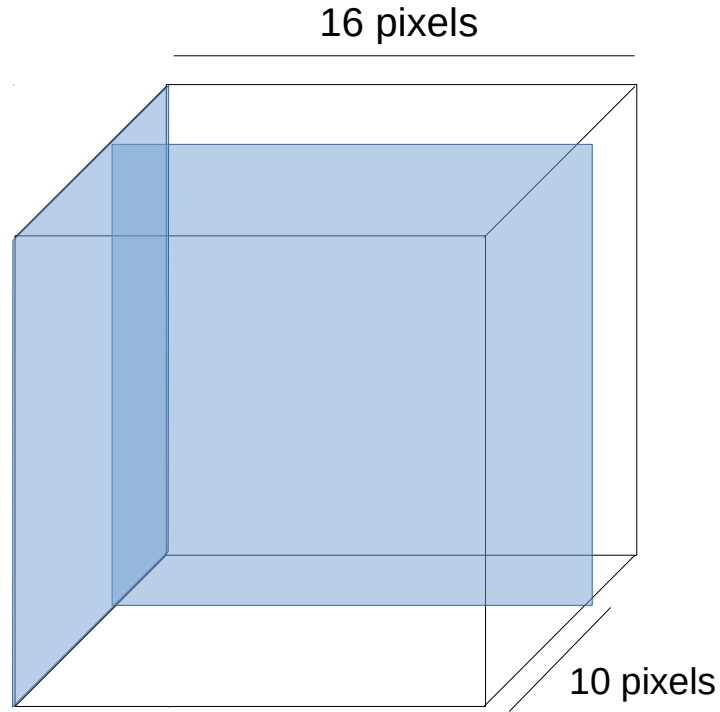


$$\begin{aligned} B_y & \text{ (vertical red arrow)} \\ B_z &= 0.1 B_y \\ B_x &= 0 \end{aligned}$$

Polarization angle defined in POLARIS (derived from these tests - not what is shown in manual)



Stokes parameters, no rotation

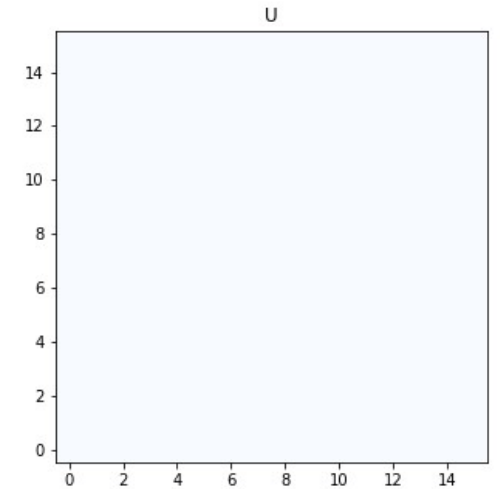
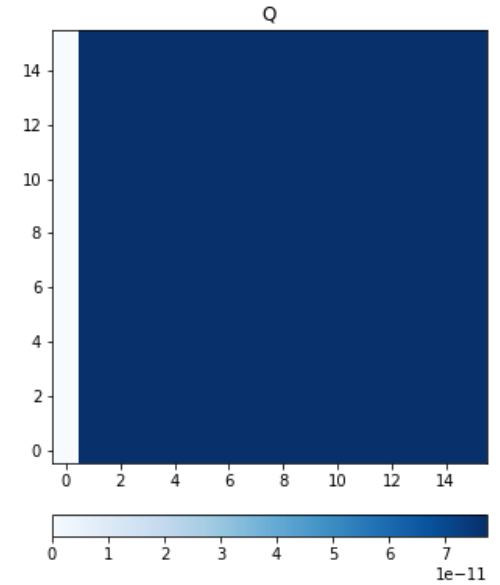


Observed:

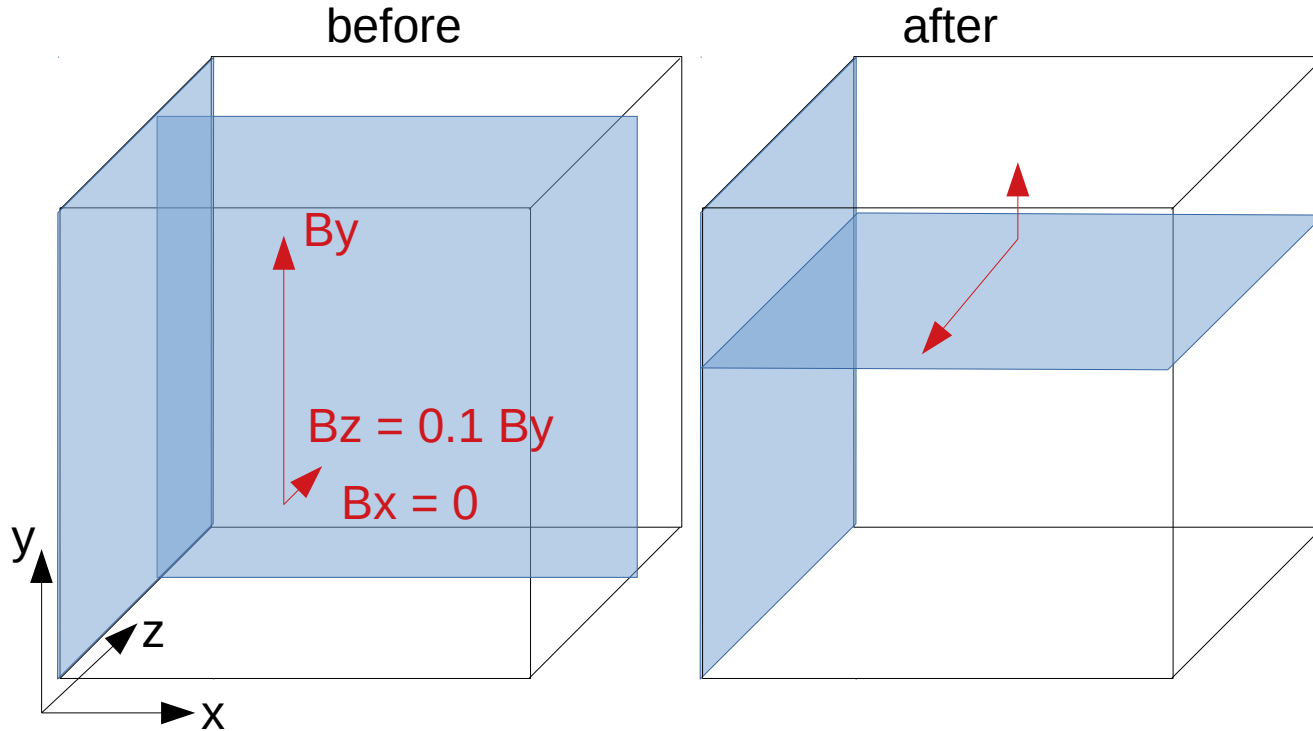
$$\theta = 0^\circ$$

$$Q > 0$$

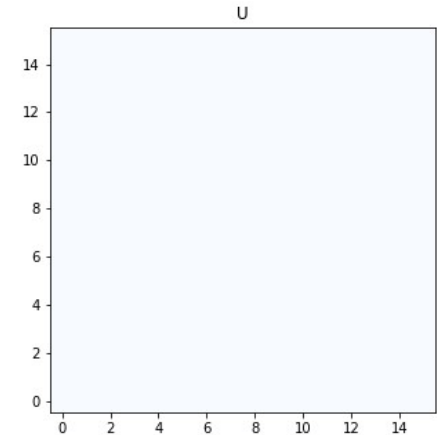
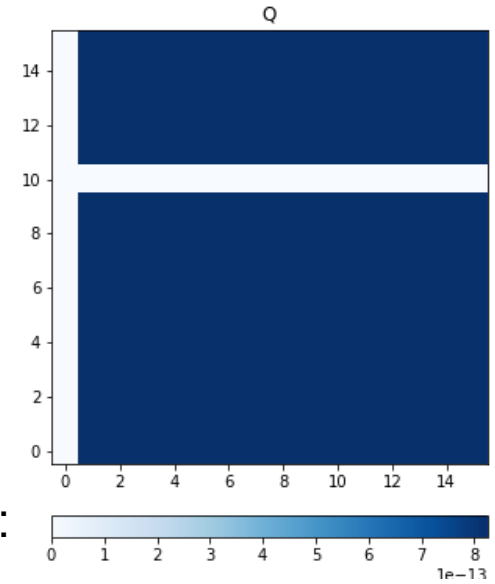
$$U = 0$$



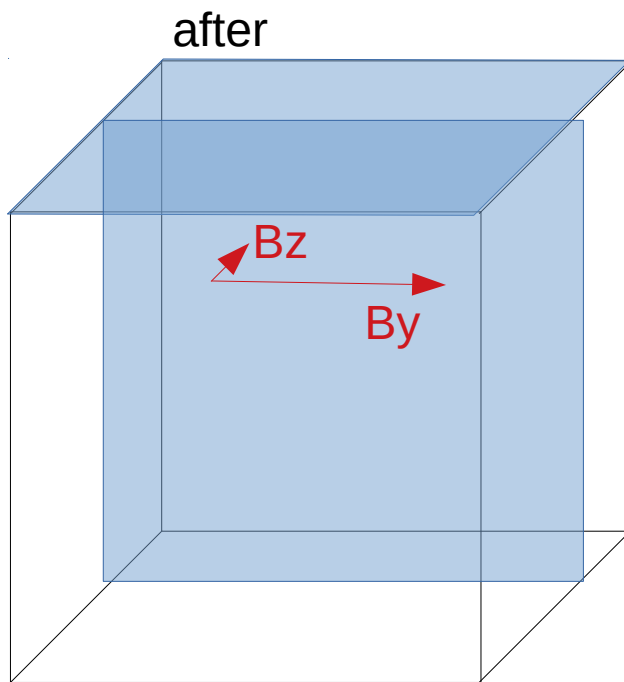
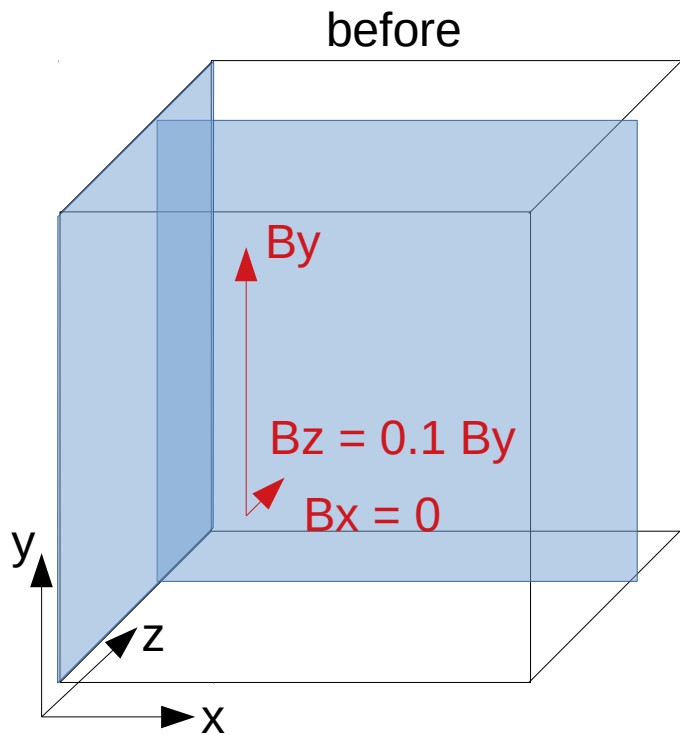
Stokes for rotation around x by 90°



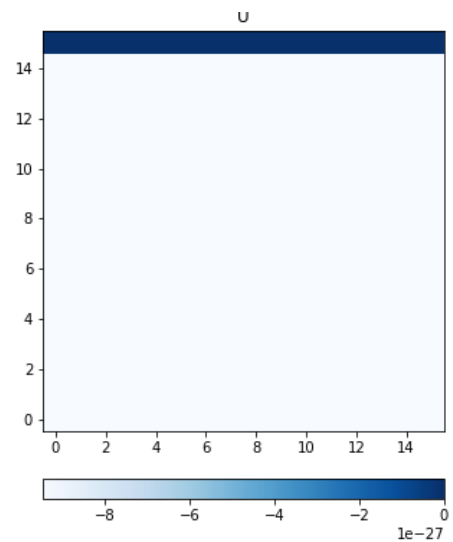
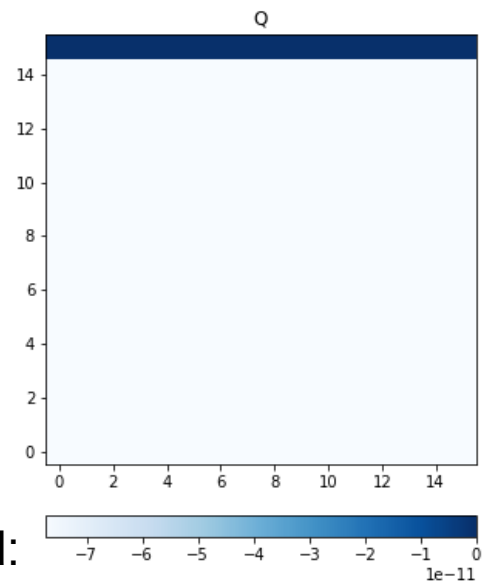
Observed:
 $\theta = 0^\circ$
 $Q > 0$
 $U = 0$



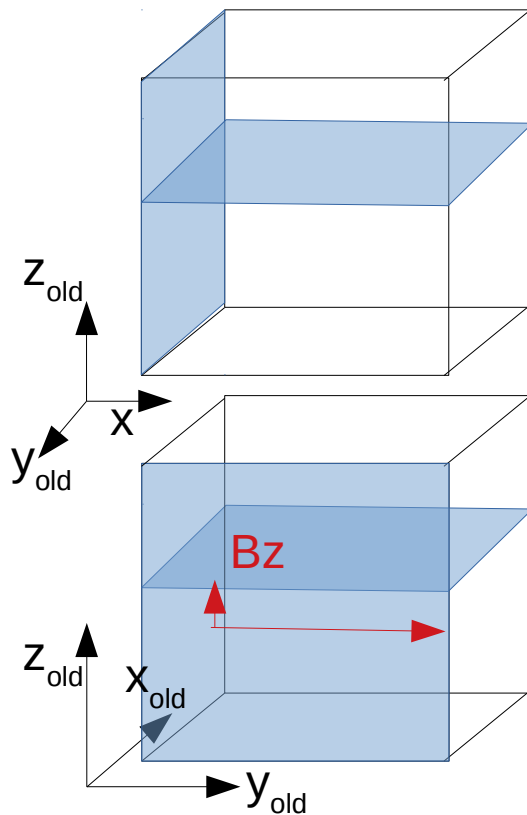
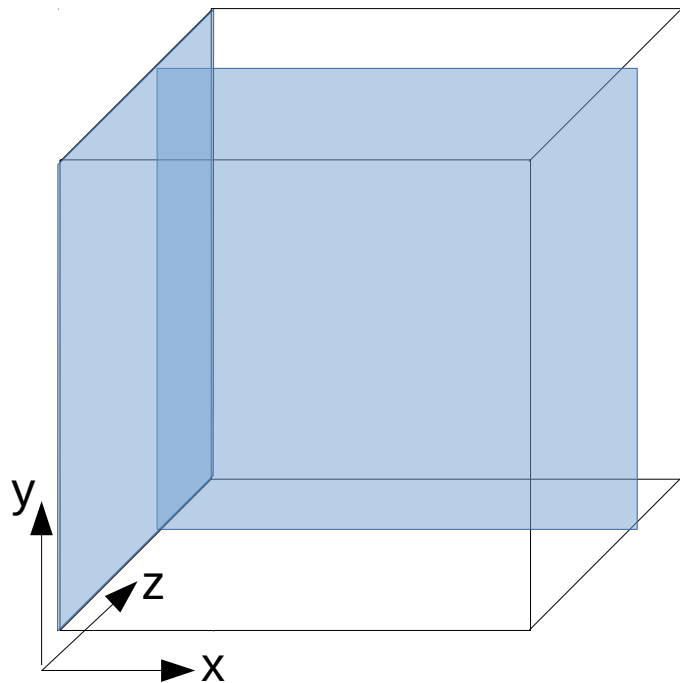
Stokes for rotation around z by 90°



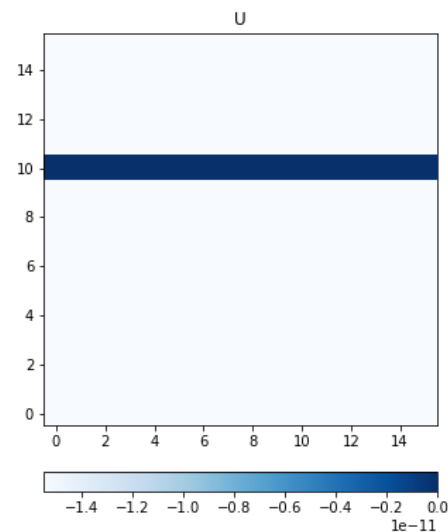
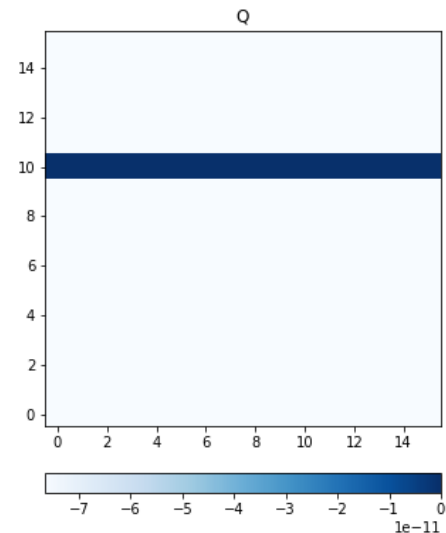
Observed:
 $\theta = 270^\circ$
 $Q < 0$
 $U = 0$



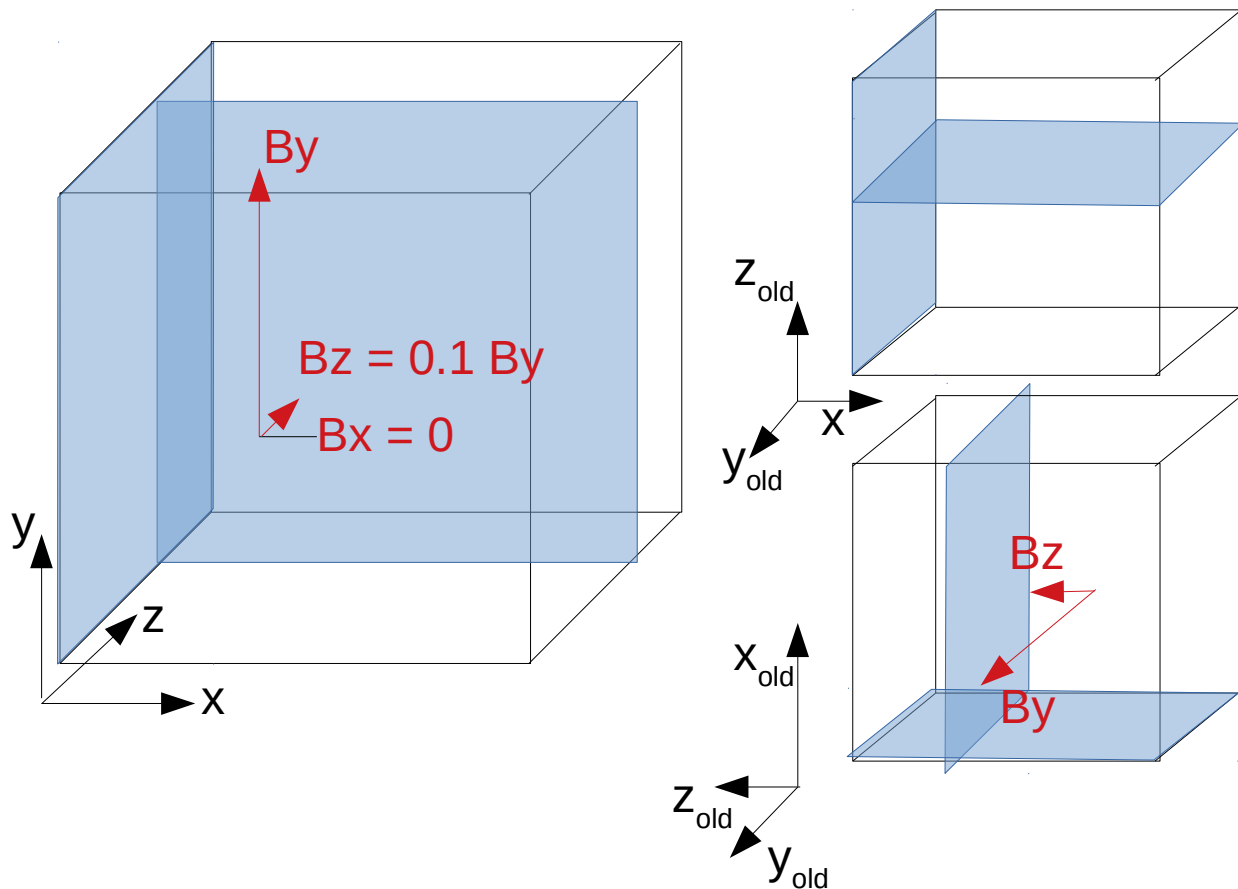
Detector rotated first around x by 90° and
then around (old) z by 90°



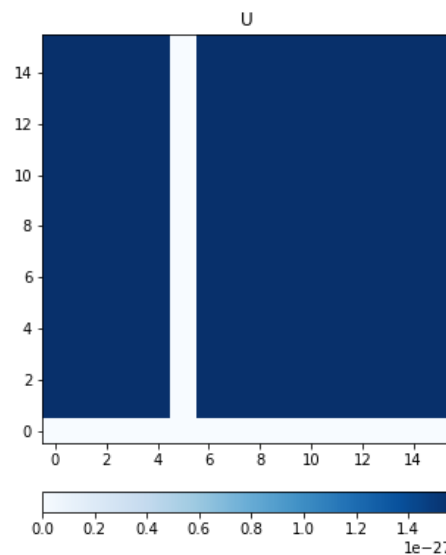
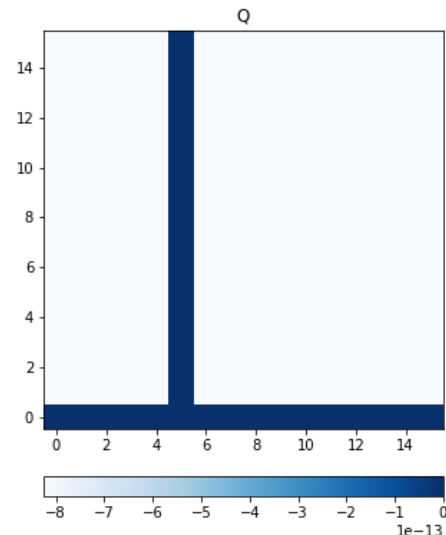
Observed:
 $\theta = 276^\circ$
 $Q < 0$
 $U < 0$



Detector rotated first around x by 90° and
then around (old) y by 90°



Observed:
 $\theta = 90^\circ$
 $Q < 0$
 $U = 0$



- Done: B orientations consistent now
- To do: Check if RM consistent with direction of B