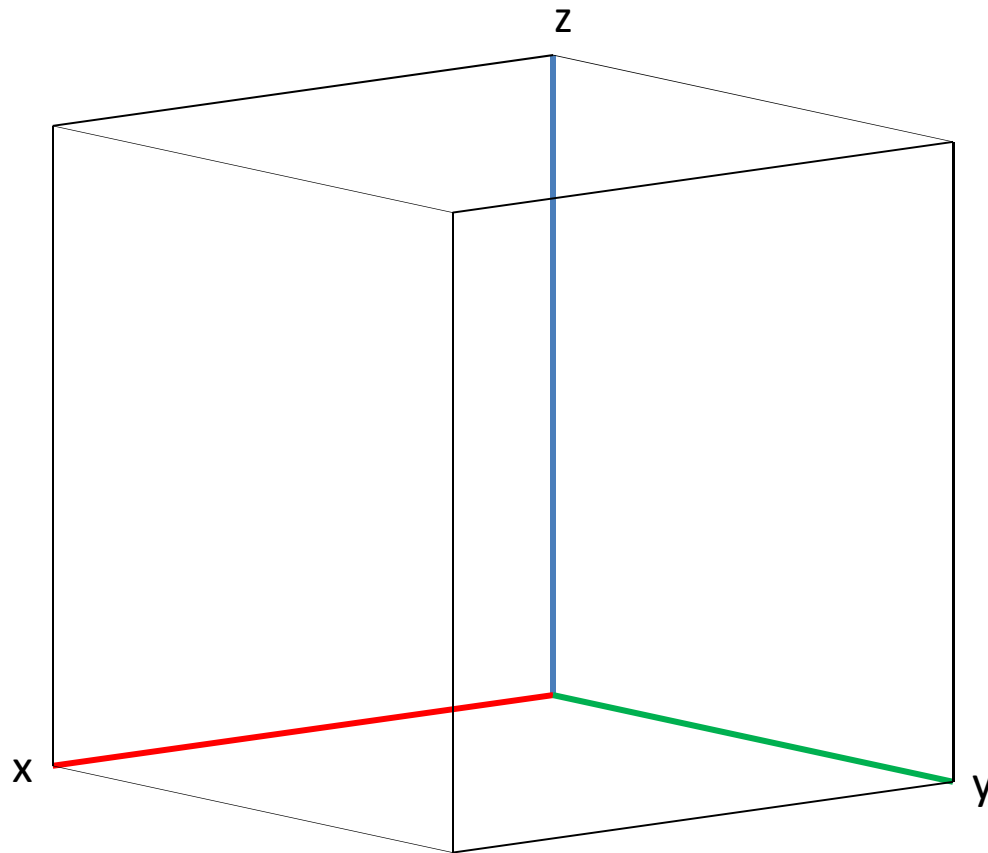


Cubic crystal

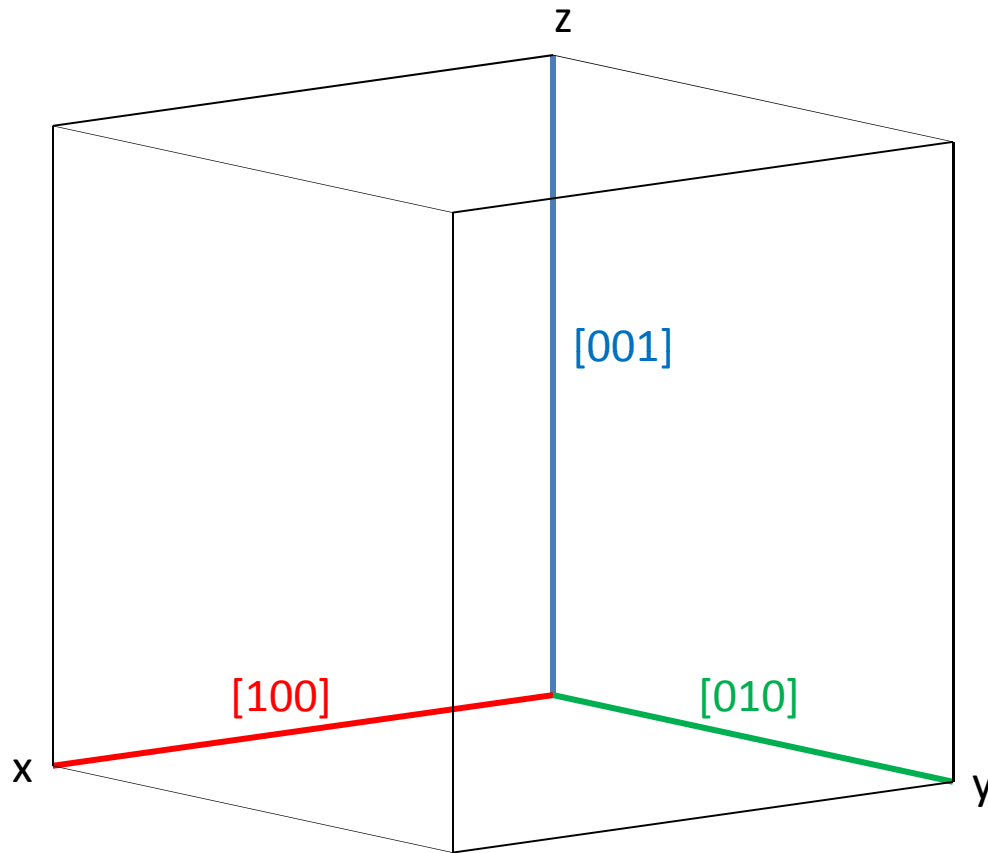


Draw the $[111]$ stereographic projection.

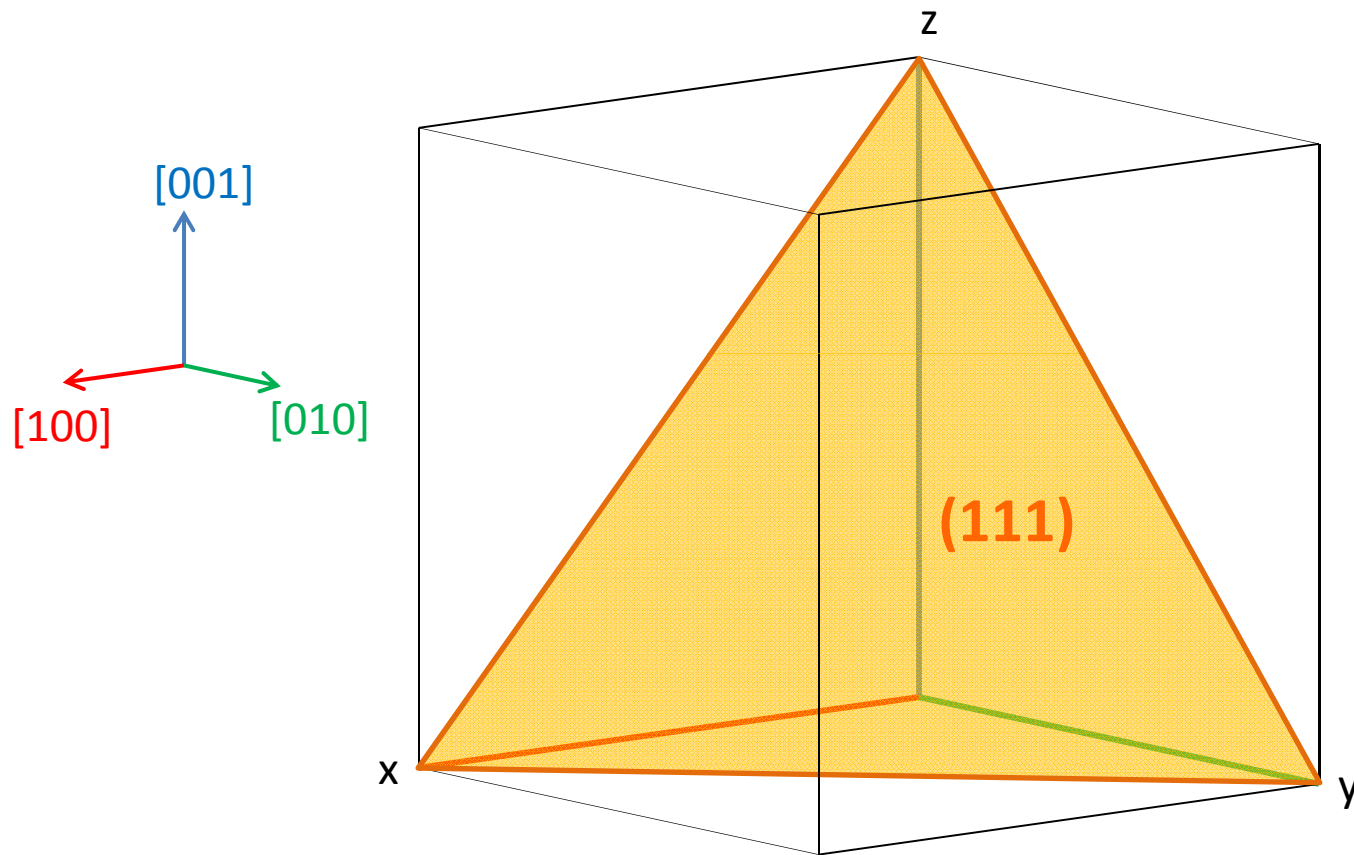
Include $\langle 100 \rangle$, $\langle 110 \rangle$, and $\langle 111 \rangle$ poles and traces

Where do we begin?

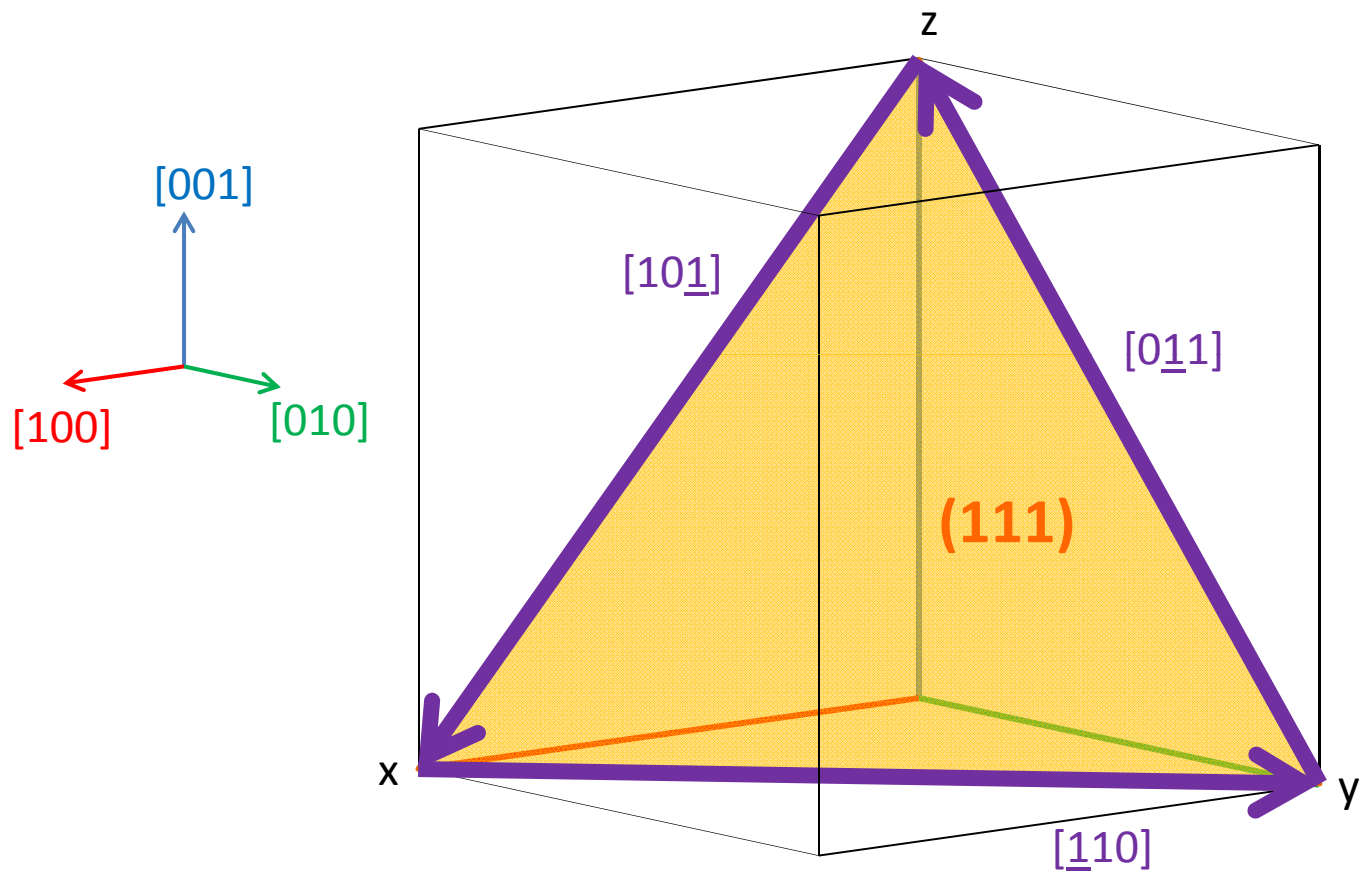
- Start with what you know!
- Look at the crystal. Then look at the [111] plane.
- What do they look like relative to one another?

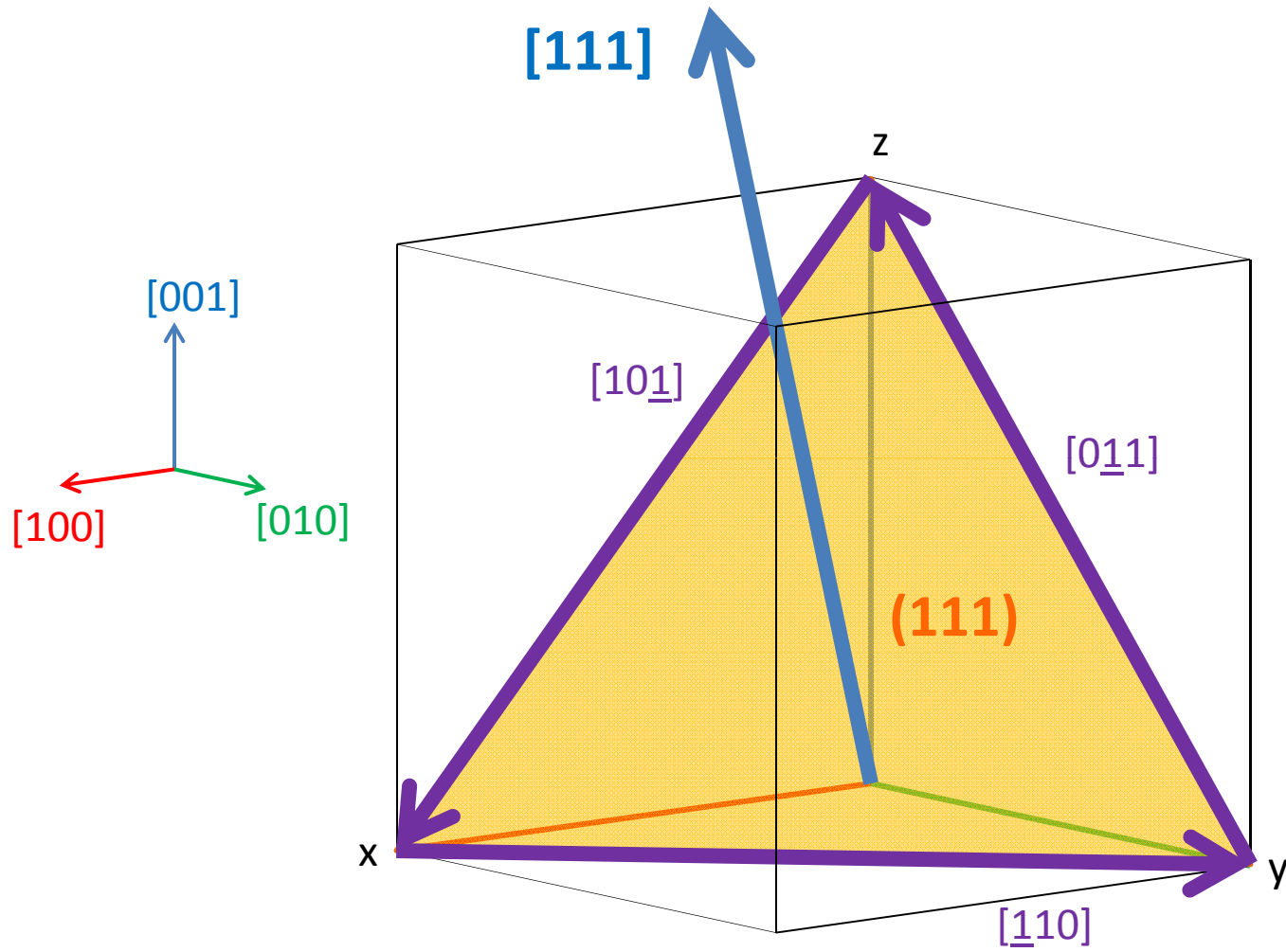


What does (111) look like?

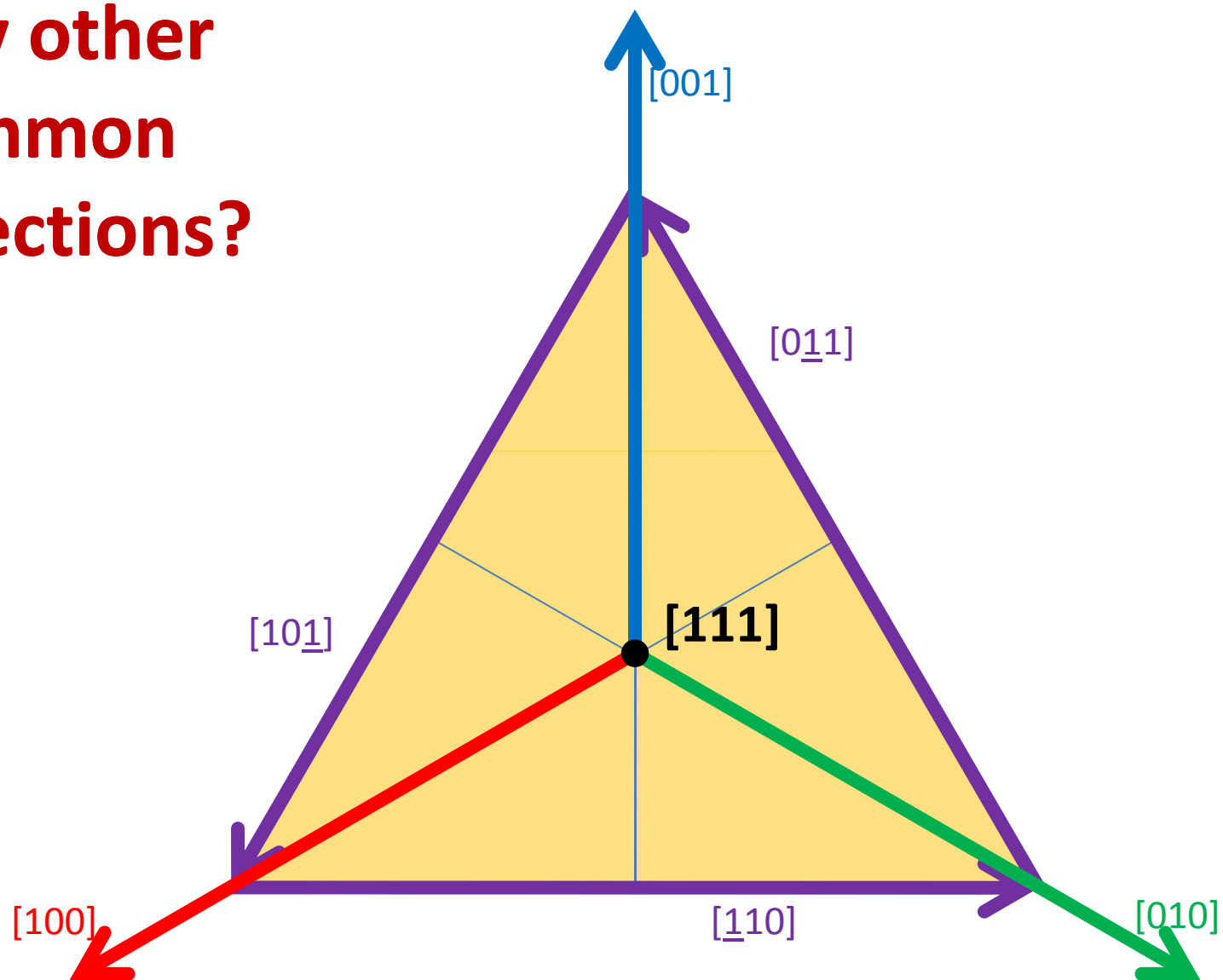


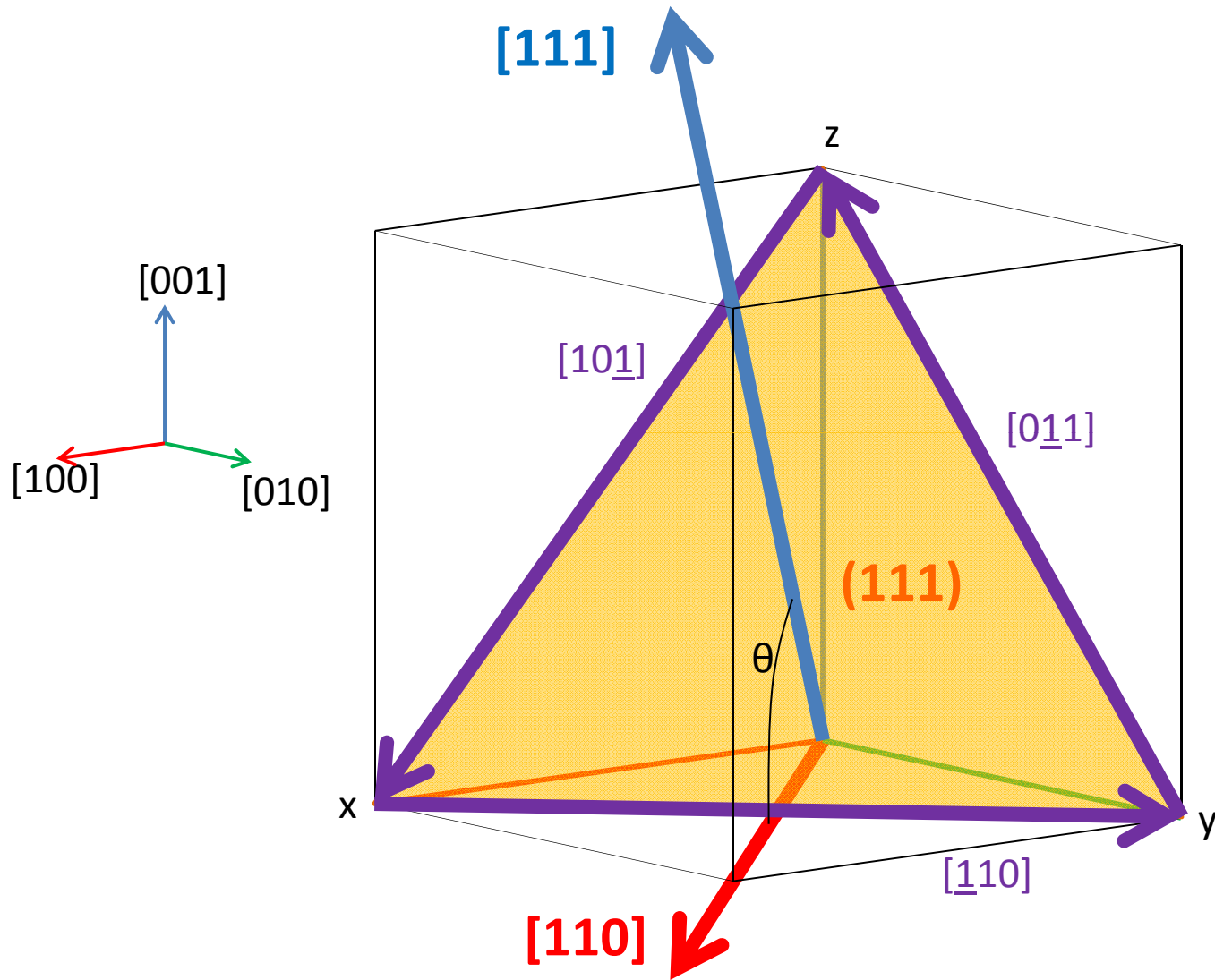
What directions are on the sides?



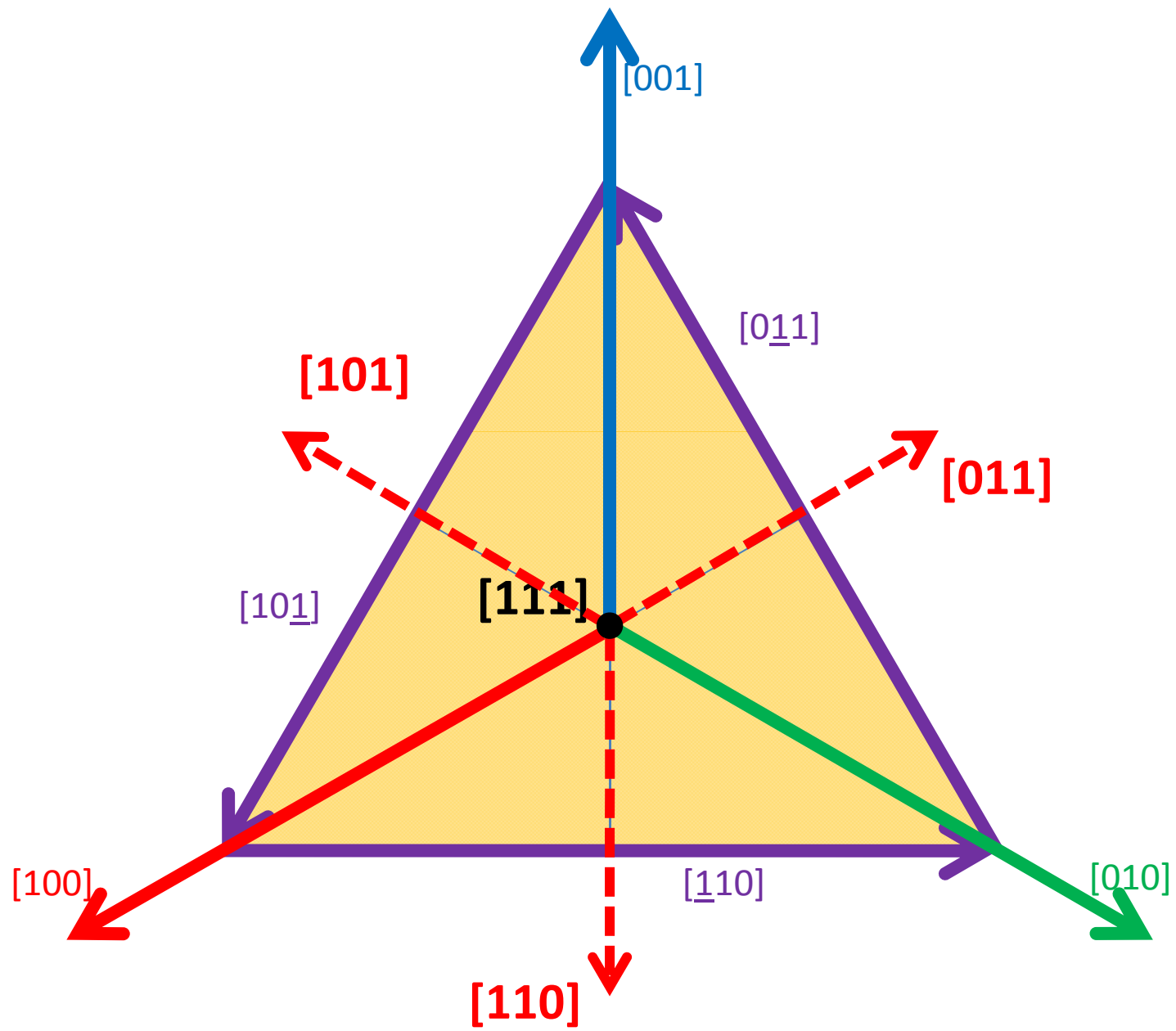


**Any other
common
directions?**





$$\theta = \cos^{-1} \left(\frac{1 \cdot 1 + 1 \cdot 1 + 1 \cdot 0}{\sqrt{1^2 + 1^2 + 1^2} \sqrt{1^2 + 1^2 + 0^2}} \right) = \cos^{-1} \left(\frac{2}{\sqrt{3}\sqrt{2}} \right) = 35.3^\circ$$



Weiss Zone Law

- If (hkl) is in zone [uvw]:

$$hu + kv + lw = 0$$

- This also means that the poles associated with that zone are 90° away from the zone axis.
- Center of stereographic projection is a zone axis!

What else do we know?

- $\langle 110 \rangle$ type poles lie on (111) plane!
 - $[\underline{1}10]$, $[0\underline{1}1]$, $[10\underline{1}]$
 - $[1\underline{1}0]$, $[01\underline{1}]$, $[\underline{1}01]$ (*these are the negatives*)
 - $[101]$, $[011]$, $[110]$ (these are 35.3° away from $[111]$)
- What about the $\langle 100 \rangle$'s?
 - $[100]$, $[010]$, $[001]$ (these are 54.7° away from $[111]$)
 - $[110]$ lies between $[100]$ and $[010]$ on the same trace!
 - $[110]$ is 45° away from $[100]$.

What else do we know?

- What about the $\langle 111 \rangle$ type poles?
 - $[\underline{1}11]$, $[1\underline{1}1]$, $[11\underline{1}]$ (these are 70.5° away from $[111]$)
 - $[11\underline{1}]$ is 70.5° from $[111]$ towards $[110]$.
 - Look at the drawing on the next page. $[11\underline{1}]$ projects on the same line as $[110]$.

