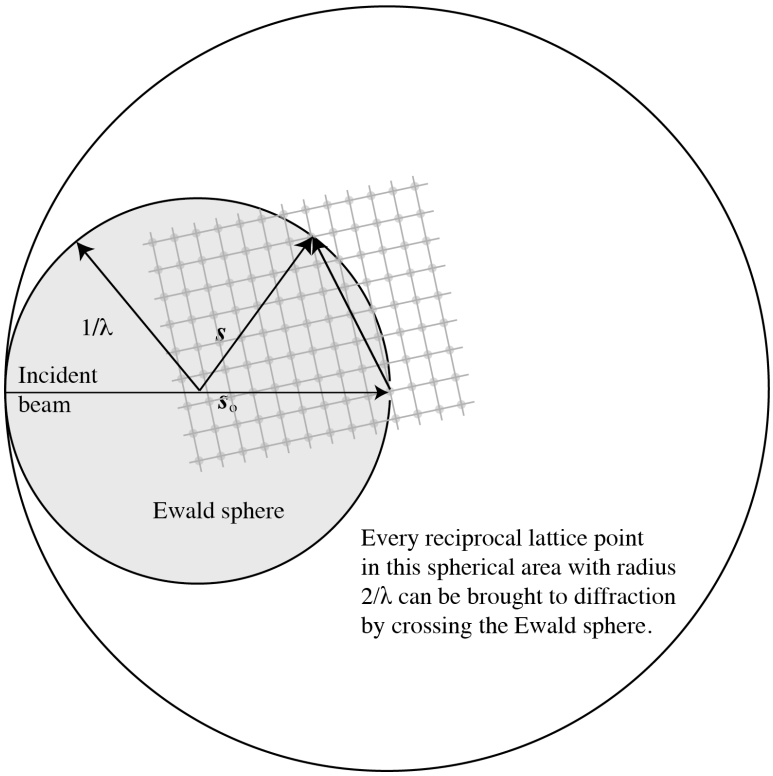
Given a crystal with unit cell volume V and a wavelength λ for the incident beam, how many different intensities can be collected in a diffraction experiment?

Any reciprocal vector **h** must be brought to the surface of the Ewald sphere to satisfy the Laue condition for diffraction.

The following diagram indicates which of the possible vectors **h** can be brought to cross the sphere.



We see that all the reciprocal lattice points inside a sphere of 2/λ can cross the Ewald sphere. The number of lattice points is the ratio of the volume of the big sphere and the volume of the reciprocal lattice which is given by the relation $VV^*=1$. Therefore the total number of accessible diffracted intensities n is

$$n = \frac{V^*_{tot}}{V^*} = \frac{4}{3}\pi R^3 V = \frac{4}{3}\pi(\frac{2}{\lambda})^3 V = \frac{32\pi V}{3\lambda^3}$$