In P406 Lecture Notes 3 (*p*. 8-11), we discussed the phenomenon of sound diffraction – through apertures and around obstacles. Sound waves *e.g*. passing through a narrow opening spread out due to diffraction of the sound – the wavelength of the sound, size of the aperture / opening and the geometrical shape of opening dictate how the sound spreads out, and how much it spreads out in passing through the aperture. With two or more openings, both diffraction and interference phenomena occur, the latter can be constructive/destructive, or anywhere in between, depending on the relative phase of the waves at a given observation/listening point in 3-D space. A diffraction grating with many narrow, parallel slits illuminated either by light or sound is one example of such phenomena. Diffraction gratings also work for ***reflection*** of light (and/or sound!) off of the surface of a reflection diffraction grating of width L, consisting of N_s finely spaced parallel grooves, each separated by a very small distance $d = L/N_s \sim \lambda$, the wavelength of light. For light at normal incidence on the reflection diffraction grating, the diffracted light has maxima at an angle(s) $\pm\theta_m$ from the normal to the surface of the diffraction grating, given by the formula $d\sin\theta_m = m\lambda$ where the integer m = 0, ±1, ±2, ±3, … {the value of $|m|$ is known as the *order* of the diffraction}. The following two pictures respectively show the image of a MagLite flashlight's lightbulb viewed through a transmission diffraction grating, and the image of a white light source viewed from a large reflection diffraction grating. Note that if the angle of incidence of the light with respect to the normal is θ_i, it is straightforward to show that the above formula becomes: $d\left(\sin\theta_m + \sin\theta_i\right) = m\lambda$.