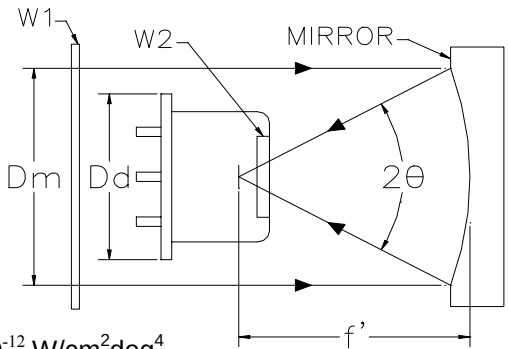
# DEXTER RESEARCH CENTER, INC.

## Detector Signal Calculation




**Power On Detector:** $\Delta\Phi = \tau_0\tau_1\tau_2\rho(\Delta L)\pi SIN^2\theta Ad$ Watts

$\theta \approx TAN^{-1}\left(\frac{Dm}{2f'}\right)$; $\Delta L = \frac{4\sigma T^3 \Delta T}{\pi}$

**Where:**

$\tau_1\tau_2$ = Transmission of Windows $W_1$ & $W_2$ $\sigma = 5.6686 \times 10^{-12}$ W/cm$^2$deg$^4$

$\tau_0 = 1 - \left(\frac{Dd}{Dm}\right)^2$ T = 273 + $^oC$ (T in Kelvin)

$\rho$ = Mirror Reflectance Ad = Detector Area in cm$^2$ $\mathscr{R}$ = Responsivity

**Voltage from Detector:** $\Delta V = \mathscr{R}\Delta\Phi$ Volts

**Signal to Noise Ratio:** (S/N) = $\mathscr{R}\Delta\Phi$/N; Where N = Amplifier & Detector Noise

**Sensitivity:** $\Delta T = \frac{N(S/N)}{\tau_0\tau_1\tau_2\rho(4\sigma T^3)(\mathscr{R}Ad)SIN^2\theta}\ ^oC$