

# Solution Cell Etalon

## Reference Transmission

A. Markelz

5/13/2010

$$t_r = t_{o1} e^{i\phi_{w1}} t_{i0} e^{i\phi_0} t_{o1} e^{i\phi_{w2}} t_{i0}$$

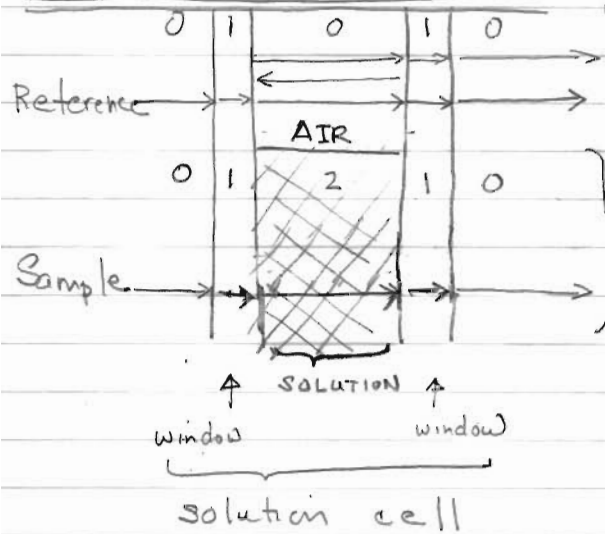
only etalon between windows, ignore etalon within windows.

$$\left[ 1 + r_{o1}^2 e^{i2\phi_0} + (r_{o1}^2 e^{i2\phi_0})^2 + \dots \right]$$

$$= \frac{t_{o1}^2 t_{i0}^2 e^{i(\phi_{w1} + \phi_0 + \phi_{w2})}}{1 - r_{o1}^2 e^{i2\phi_0}}$$

Sample transmission

$$t_s = t_{o1} e^{i\phi_{w1}} t_{i2} e^{i\phi_0} t_{o2} e^{i\phi_{w2}} t_{i0}$$



find generally have index matching of solution with window, so no reflections at 21 interfaces.

$$\frac{t_s}{t_r} = \frac{t_{o1} t_{i0} t_{i2} t_{o2} e^{i\phi_{w1}} e^{i\phi_0} e^{i\phi_{w2}}}{t_{o1}^2 t_{i0}^2 e^{i\phi_{w1}} e^{i\phi_0} e^{i\phi_{w2}}}$$

$$= \frac{t_{i2} t_{o2}}{t_{o1} t_{i0}} e^{i(\phi_2 - \phi_0)} (1 - r_{o1}^2 e^{i2\phi_0})$$

$$= \frac{4N_w N_s}{(N_w + N_s)^2} \frac{(1 + N_w)^2}{4N_w} e^{i(\phi_s - \phi_0)} (1 - r_{o1}^2 e^{i2\phi_0})$$

$$\phi_s = k_0 N_s d \quad \phi_0 = k_0 d \quad r_{o1} = \frac{1 - N_w}{1 + N_w}$$

$$t = \frac{N_s (1 + N_w)^2}{(N_w + N_s)^2} e^{i k_0 (N_s - 1) d} \left[ 1 - \left( \frac{1 - N_w}{1 + N_w} \right)^2 e^{i 2 k_0 d} \right] \checkmark$$