

# Radiative Transfer in Vacuum + Moist Air (2 FILMs)

Outgoing radiative flux at level 3:

$$R_{o,3} = \tau (\tau (\sigma T_0^4 + dR_{0-1}) + dR_{1-2}) + dR_{2-3} + \tau \beta \sigma T_A^4 + (\beta + \alpha \tau^2 + \alpha) \sigma T_L^4$$

$$R_{o,3} \approx \tau^2 \sigma T_0^4 + dR_{0-1} + dR_{1-2} + dR_{2-3} + \tau \beta \sigma T_A^4 + (\beta + \alpha \tau^2 + \alpha) \sigma T_L^4$$

Incoming radiative flux at level 0:

$$R_{i,0} = (\alpha \tau^2 + \alpha) \sigma T_0^4 + \beta \sigma T_A^4 + \tau \beta \sigma T_L^4 + \tau (\tau \sigma T_L^4 + dR_{2-1}) + dR_{1-0}$$

$$R_{i,0} \approx (\alpha \tau^2 + \alpha) \sigma T_0^4 + \beta \sigma T_A^4 + \tau \beta \sigma T_L^4 + \tau^2 \sigma T_L^4 + dR_{2-1} + dR_{1-0}$$

Film Optics

$\alpha$  Reflection

$\beta$  Absorption

$\tau$  Transmission

