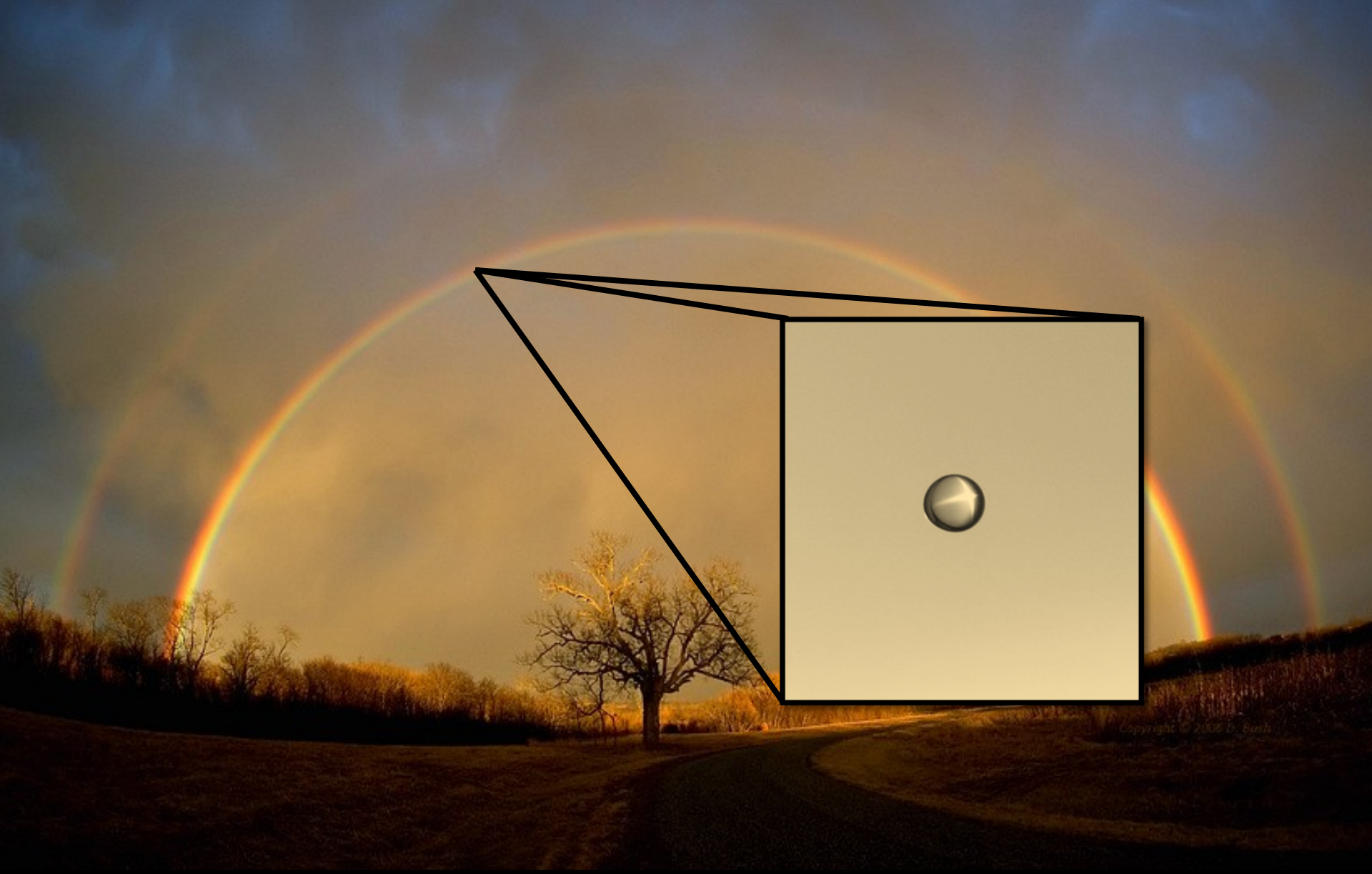
Rainbows

Adolfo Muñoz (462724)

Look&Dev demo

Modeling and Simulation of Appearance



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APPEARANCE OF RAINBOWS

Primary Bow

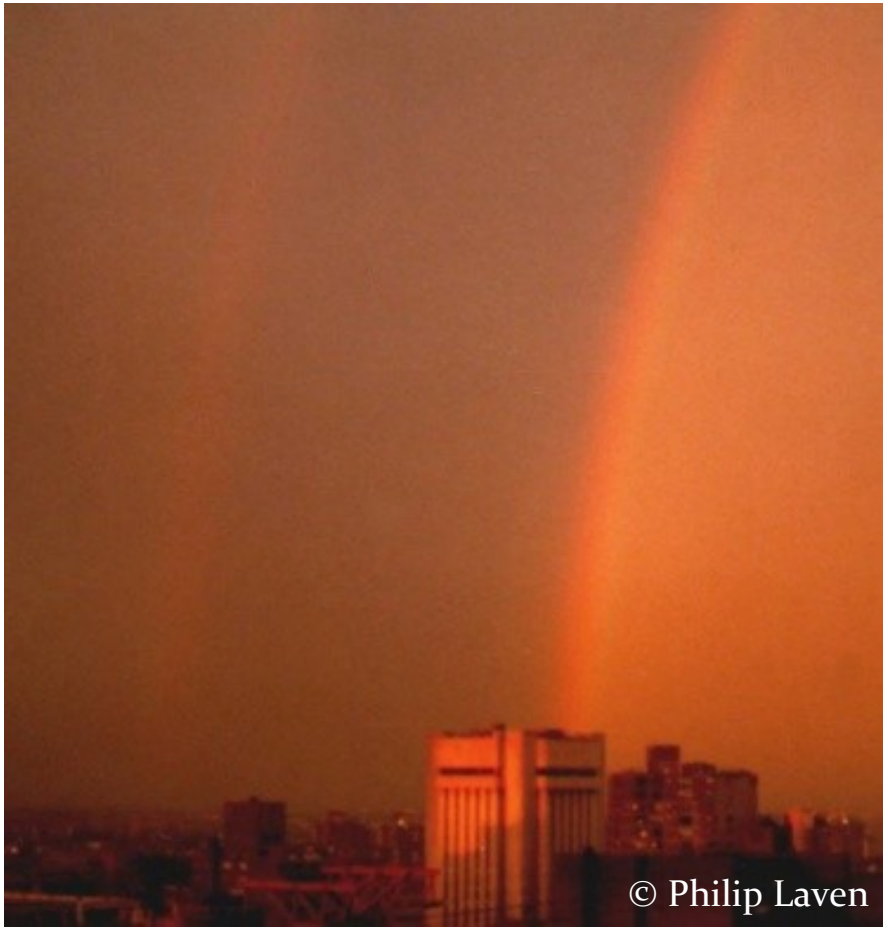
APPEARANCE OF RAINBOWS

Double Rainbow

APPEARANCE OF RAINBOWS

Double Rainbow / Alexander Dark Band

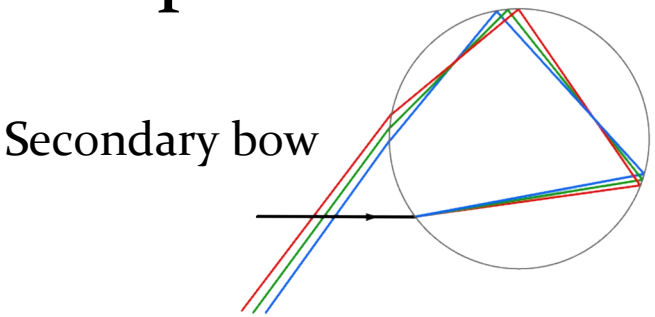
APPEARANCE OF RAINBOWS

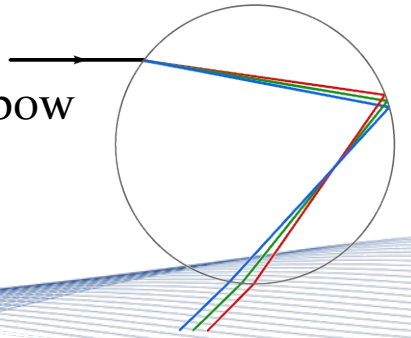


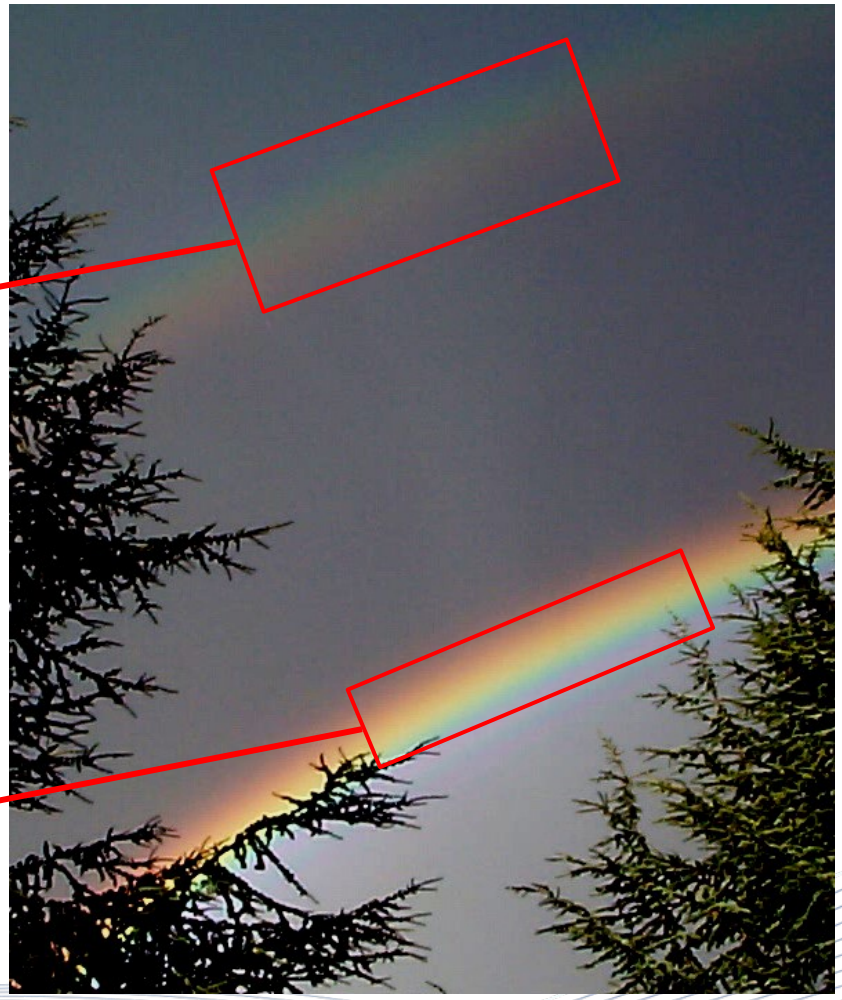
Red Bow at Sunset

APPEARANCE OF RAINBOWS

- Refraction
- Dispersion

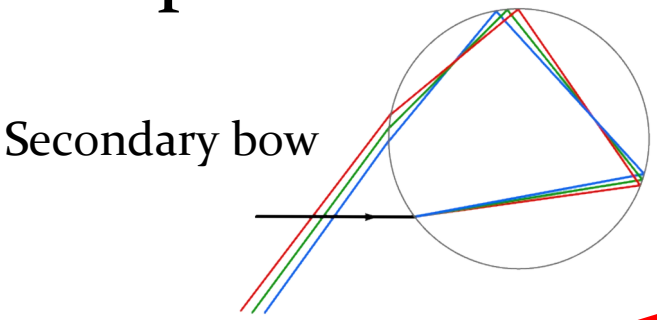




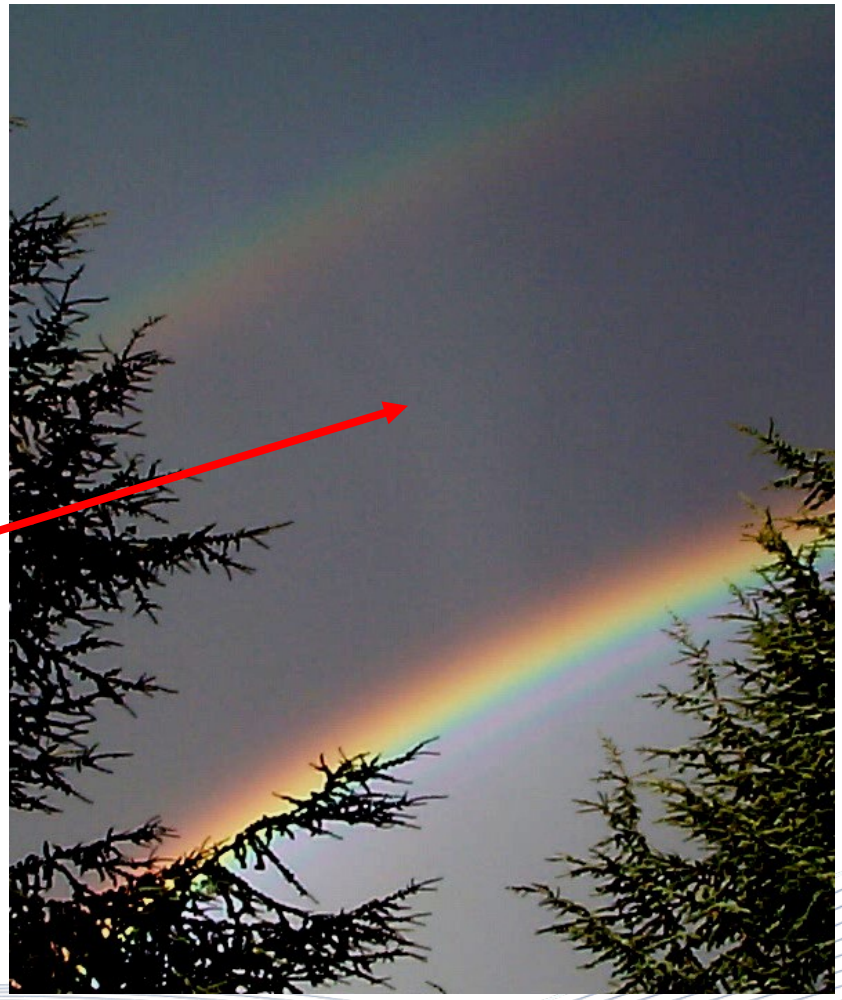


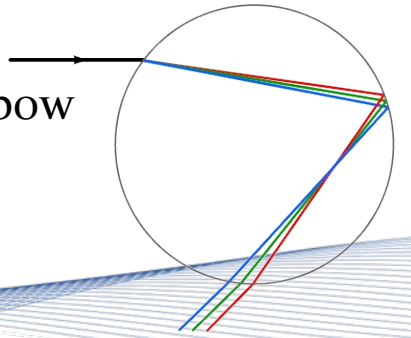
APPEARANCE OF RAINBOWS

- Refraction
- Dispersion



Alexander Dark Band



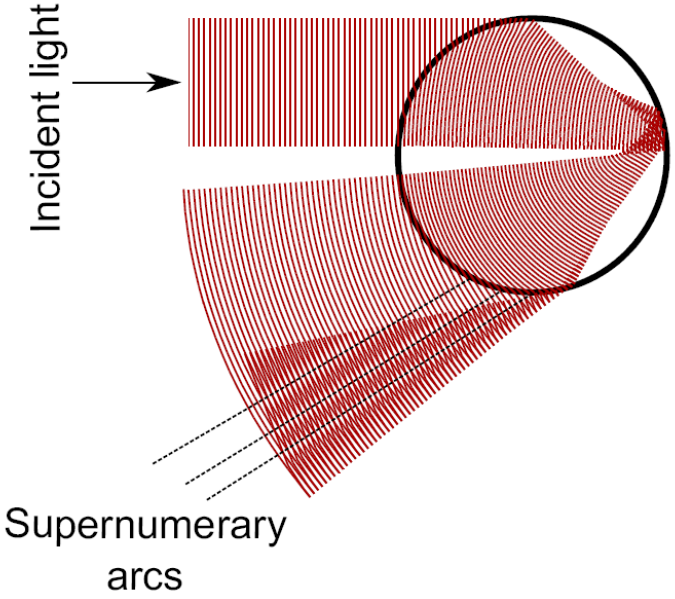


APPEARANCE OF RAINBOWS

Multiple Supernumerary Arcs

APPEARANCE OF RAINBOWS

- Interference

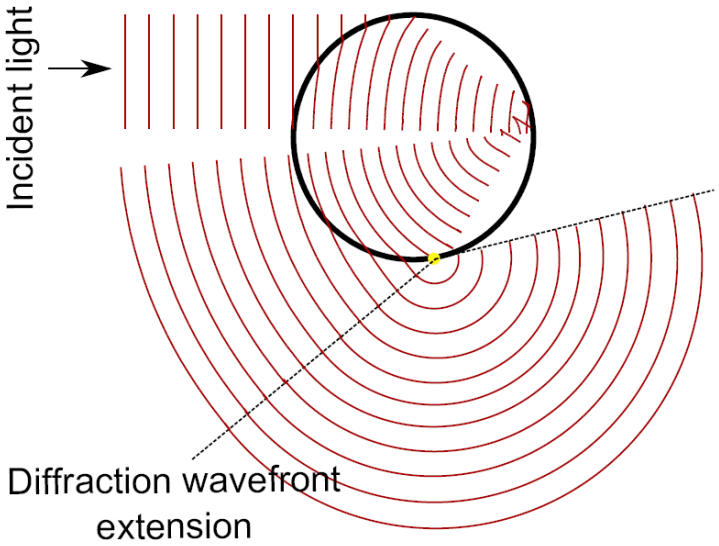


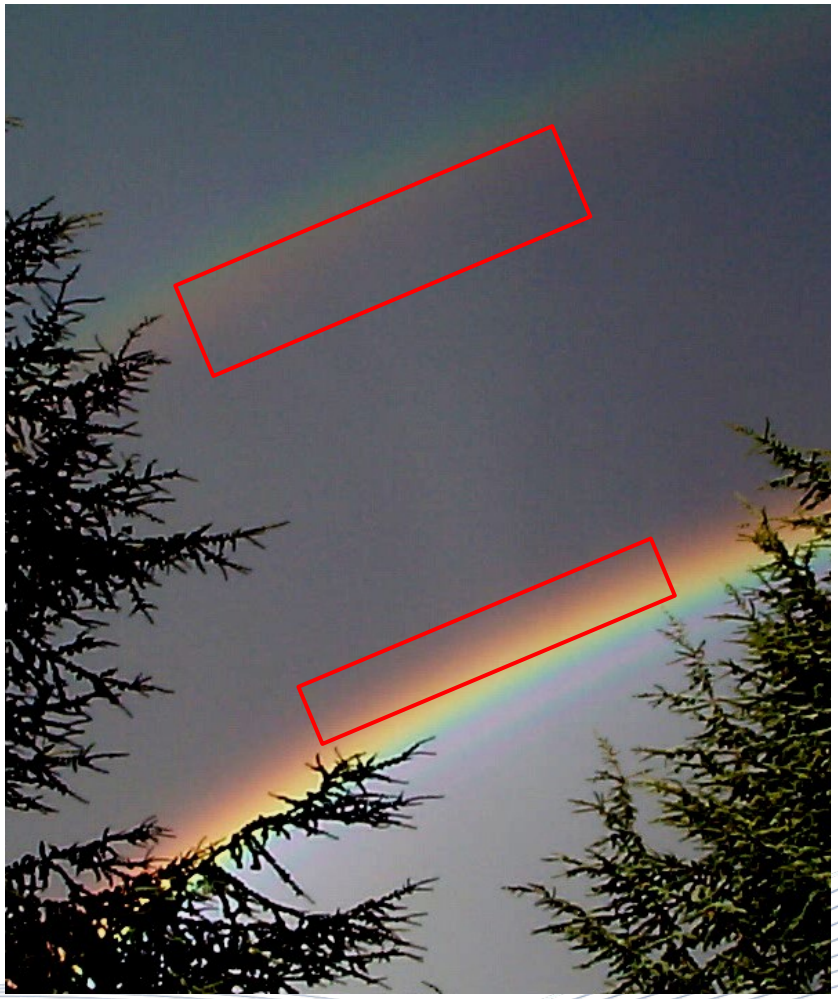
APPEARANCE OF RAINBOWS

Fog Bow

APPEARANCE OF RAINBOWS

- Diffraction





APPEARANCE OF RAINBOWS

- Refraction
- Dispersion
- Interference
- Diffraction

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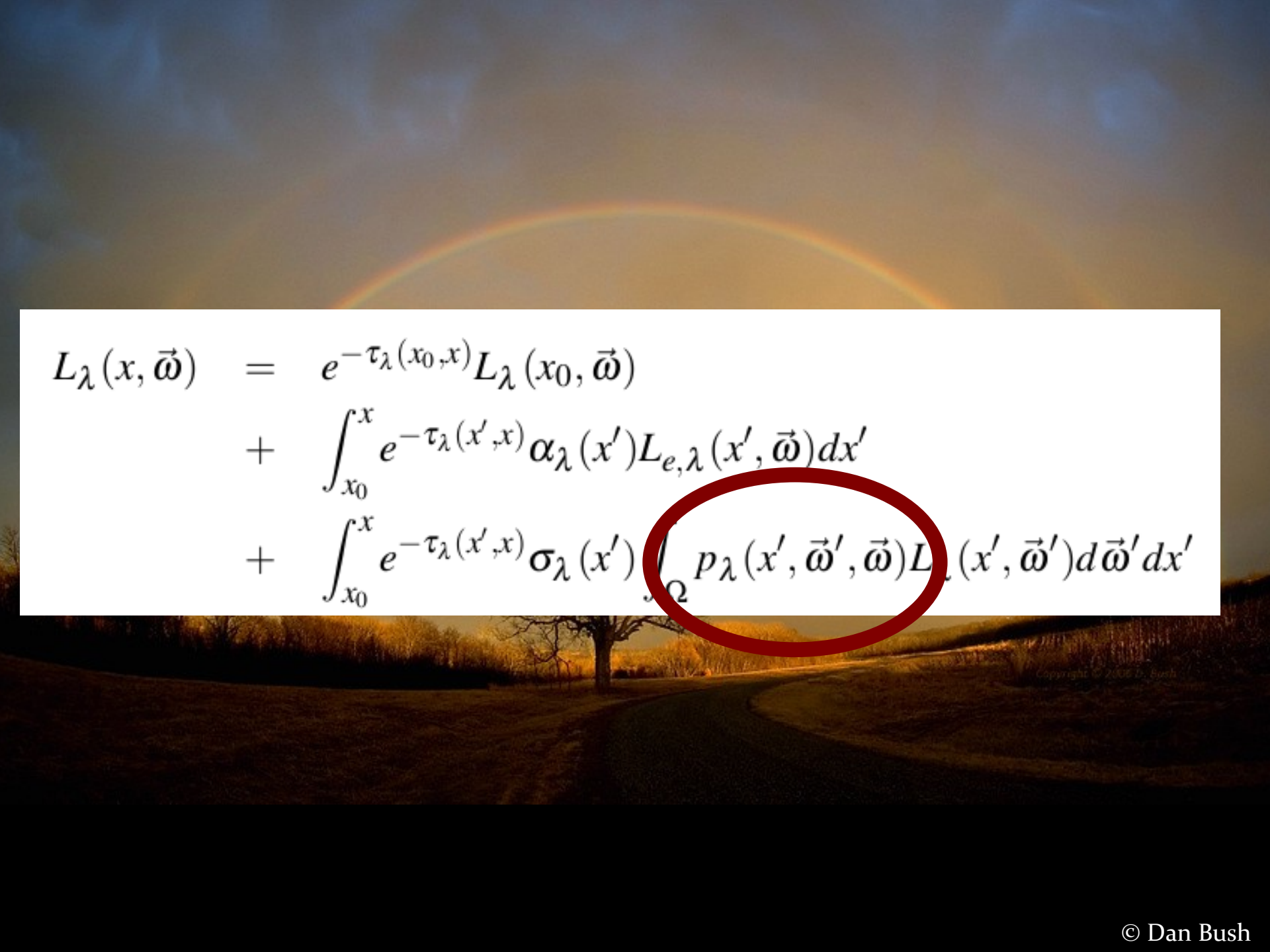

$$
\begin{aligned}
L_\lambda(x,\vec{\omega}) &= e^{-\tau_\lambda(x_0,x)} L_\lambda(x_0,\vec{\omega}) \\
&+ \int_{x_0}^{x} e^{-\tau_\lambda(x',x)} \alpha_\lambda(x') L_{e,\lambda}(x',\vec{\omega}) dx' \\
&+ \int_{x_0}^{x} e^{-\tau_\lambda(x',x)} \sigma_\lambda(x') \int_\Omega p_\lambda(x',\vec{\omega}',\vec{\omega}) L_\lambda(x',\vec{\omega}') d\vec{\omega}' dx'
\end{aligned}
$$

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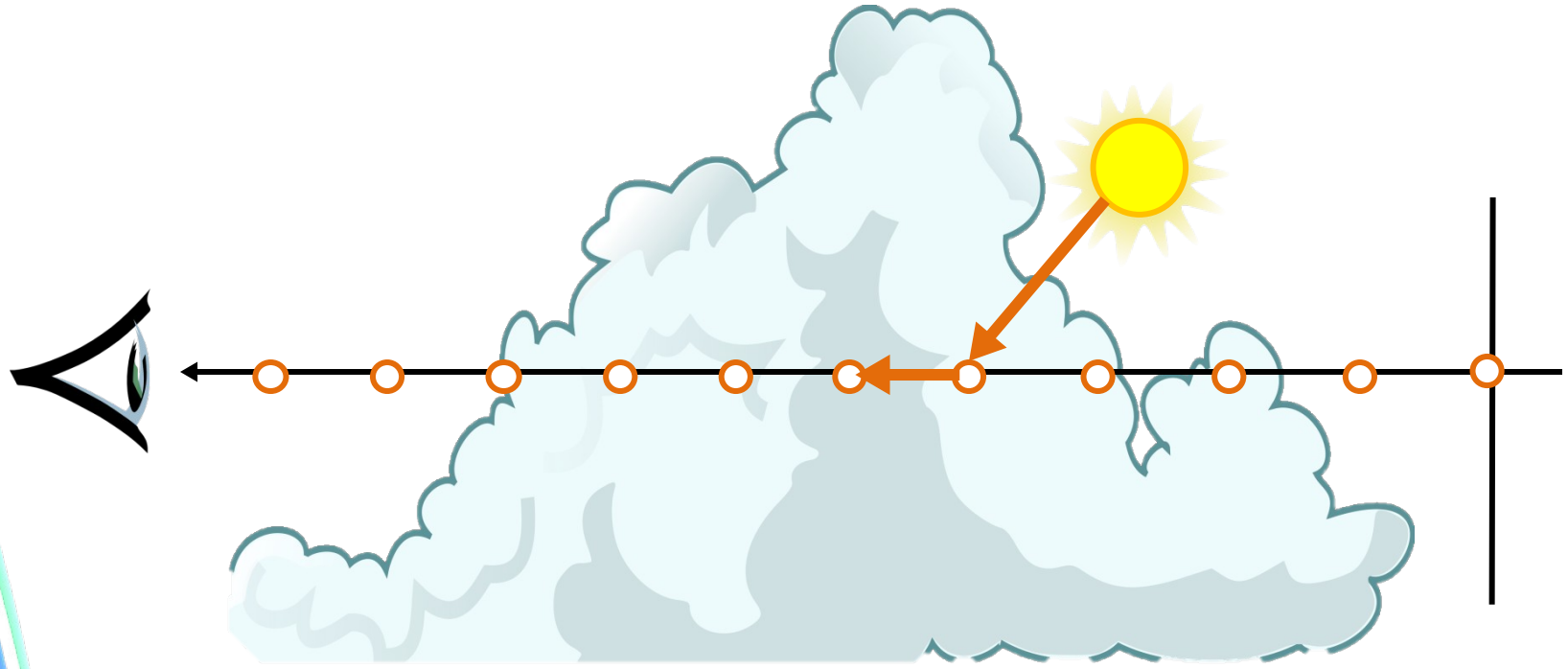
SIMULATION REQUIREMENTS

- Sun behind the camera
- Spectral rendering
- Heterogeneous medium
- Single scattering
- Phase Function (angular profile)

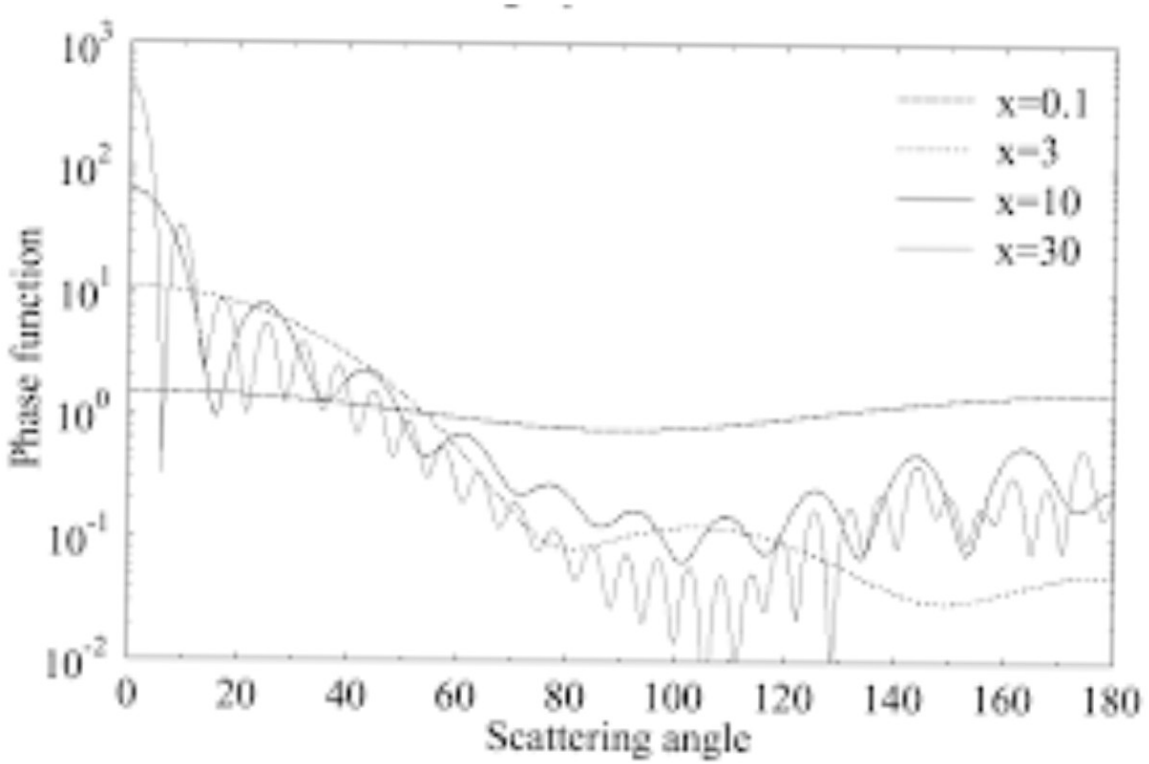
SINGLE SCATTERING

- Ray marching (boundary modeling?)



PHASE FUNCTION

- Lorenz-Mie theory (per wavelength)



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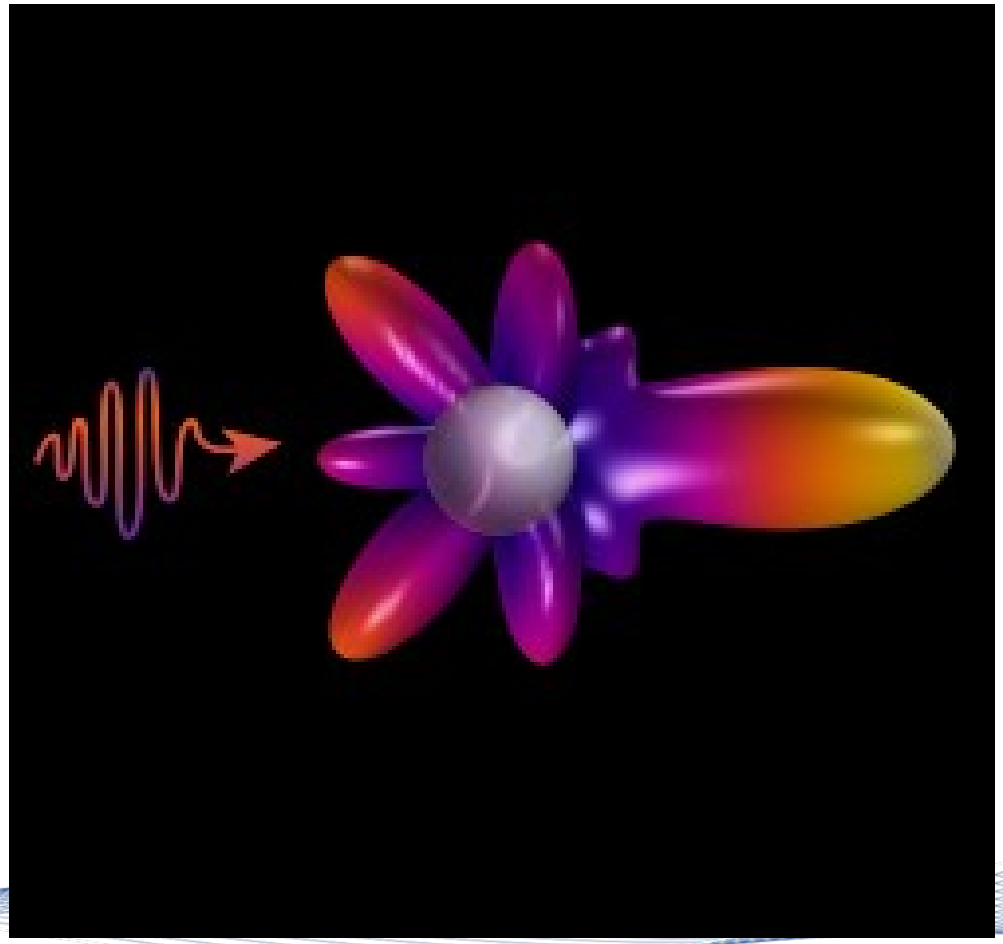

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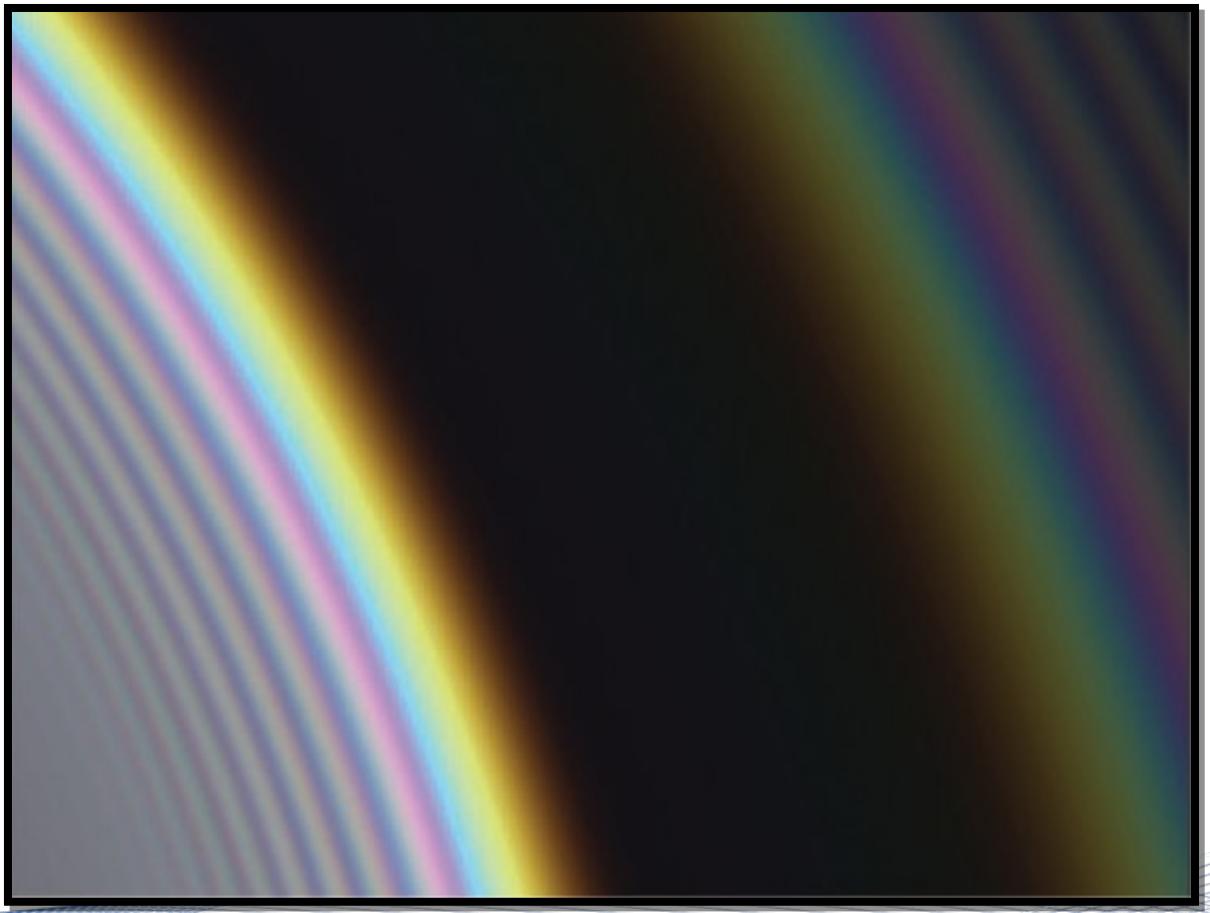

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