Global Illumination

Vocabulary of light transport

L	Light source emits a photon of light
S	Photon takes a specular bounce off an object
D	Photon takes a diffuse bounce off an object
E	Photon is absorbed by eye

Full language of light transport:

Full language of light transport:

L(S|D)*E

Full language of light transport:

L(S|D)*E

Light paths handled by ray tracing:

Full language of light transport:

L(S|D)*E

Light paths handled by ray tracing:

LDS*E

Full language of light transport:

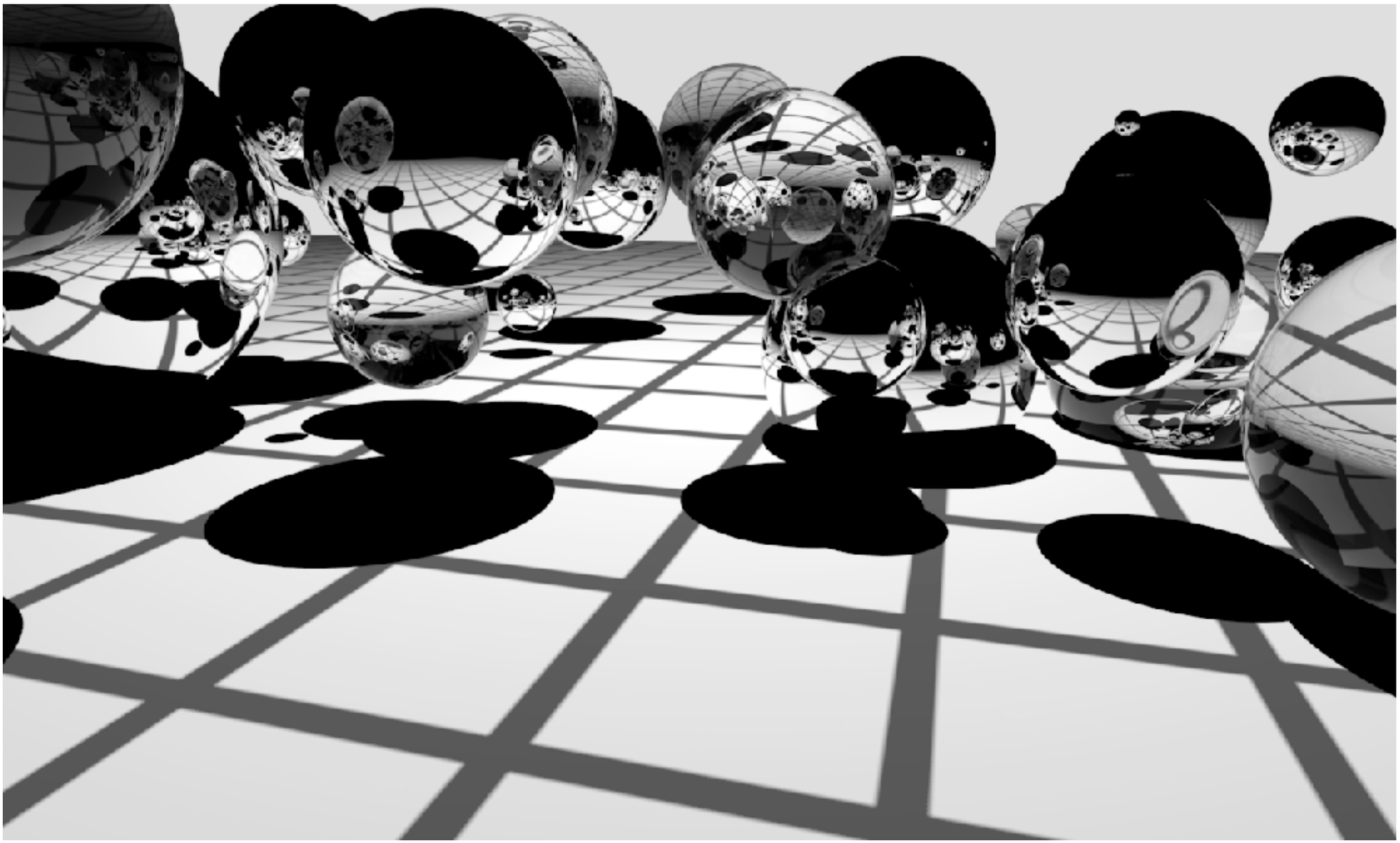
L(S|D)*E

Light paths handled by ray tracing:

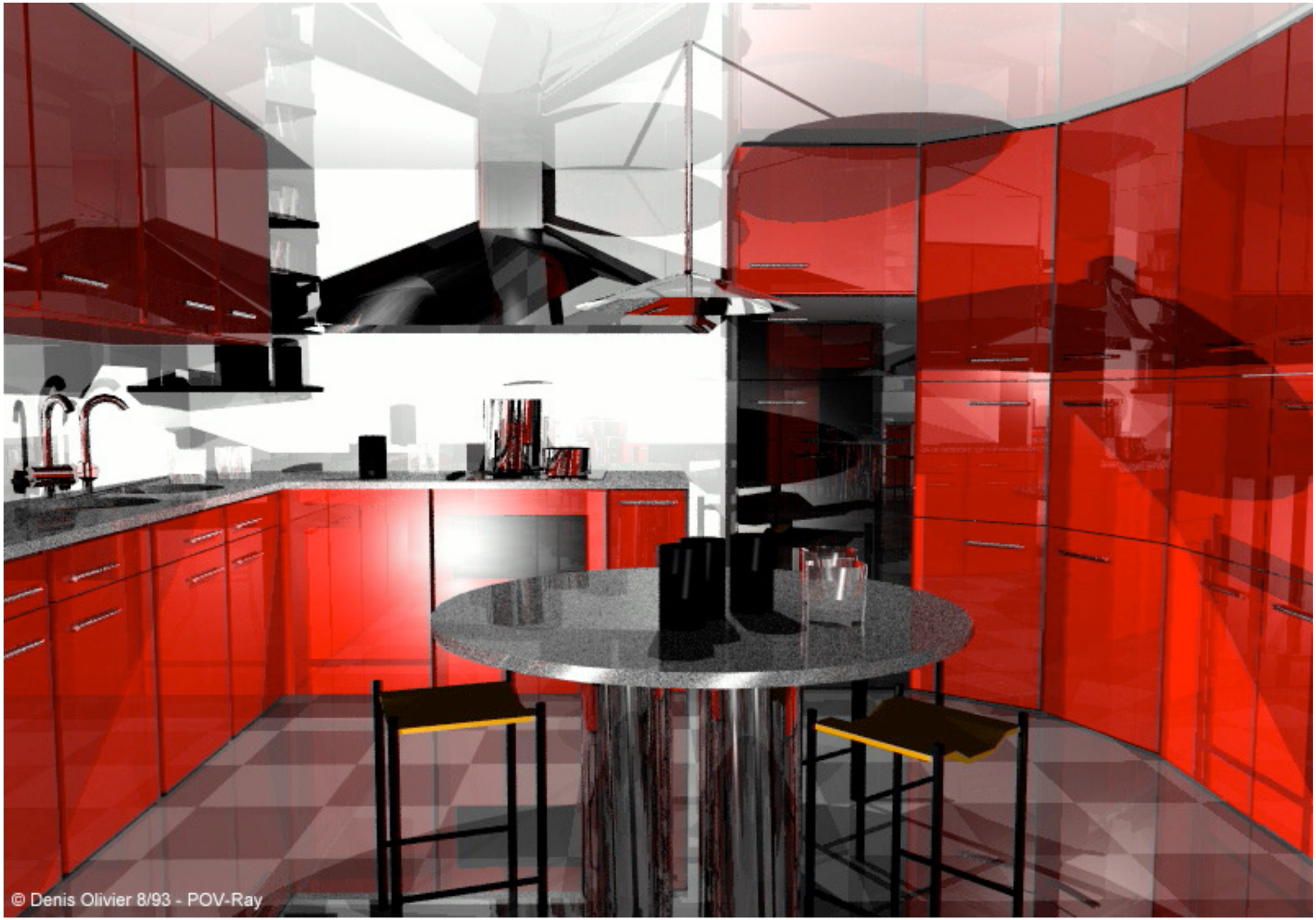
LDS*E

What will we miss?

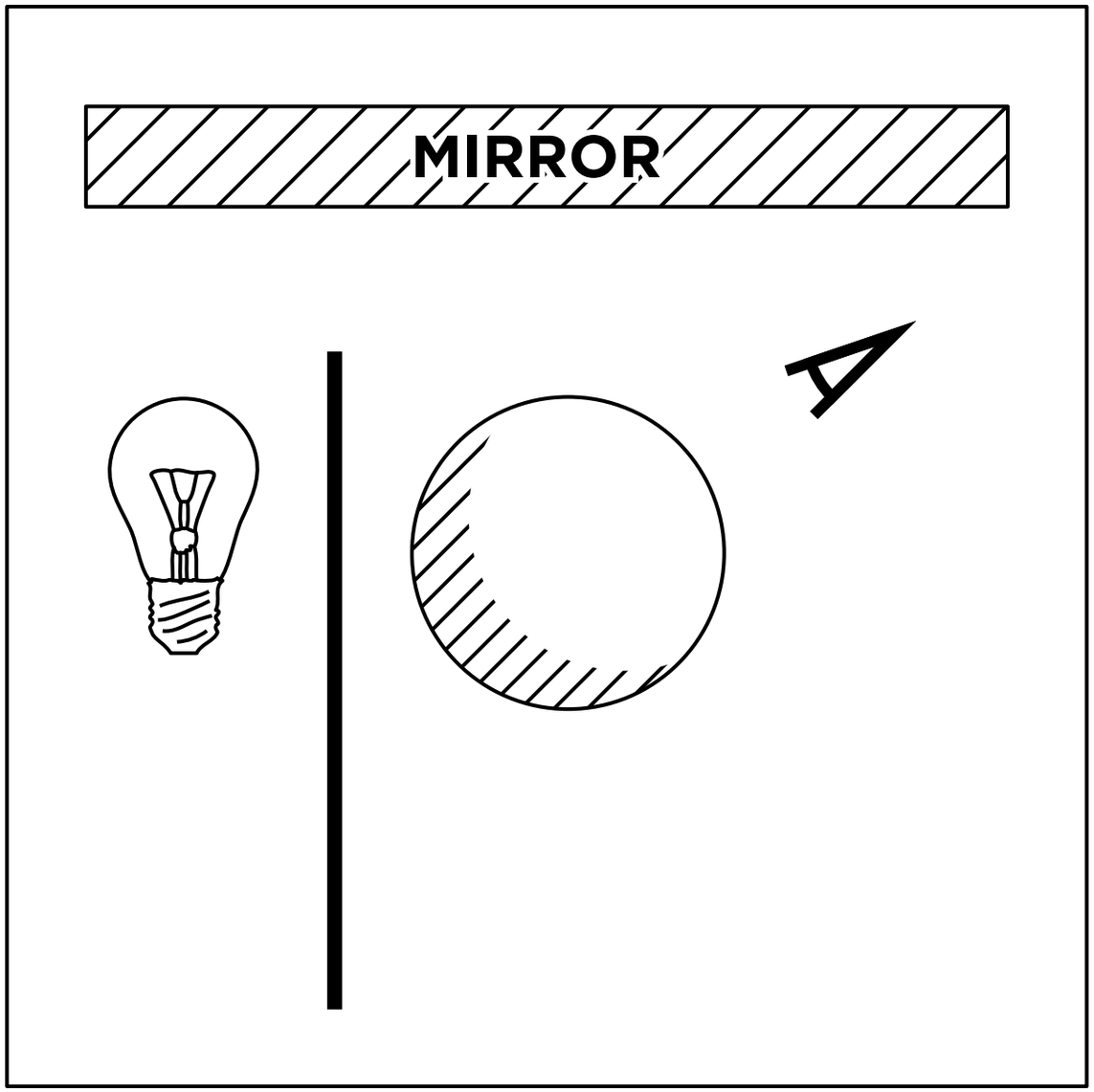
Pure ray tracing



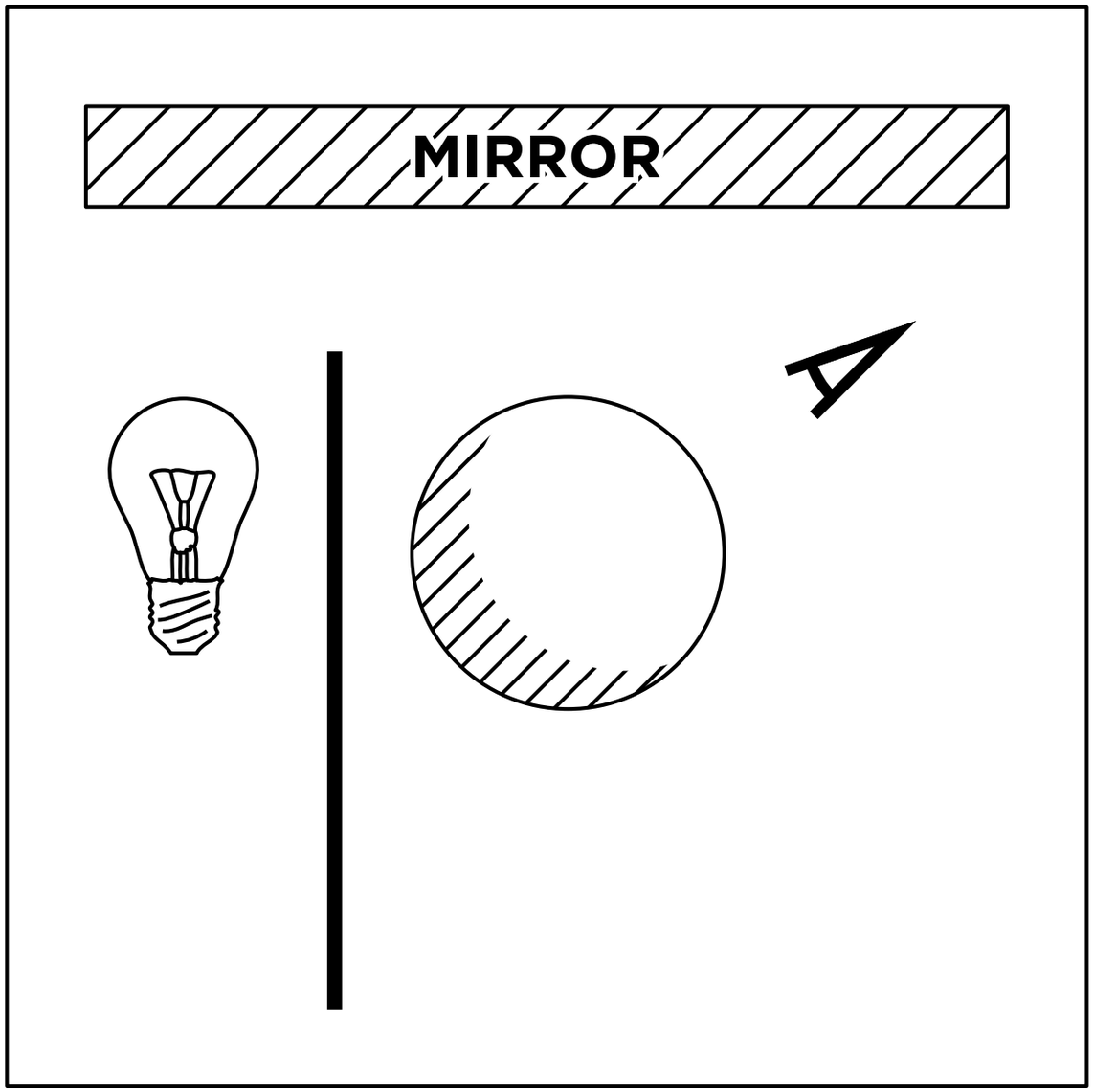
Pure ray tracing

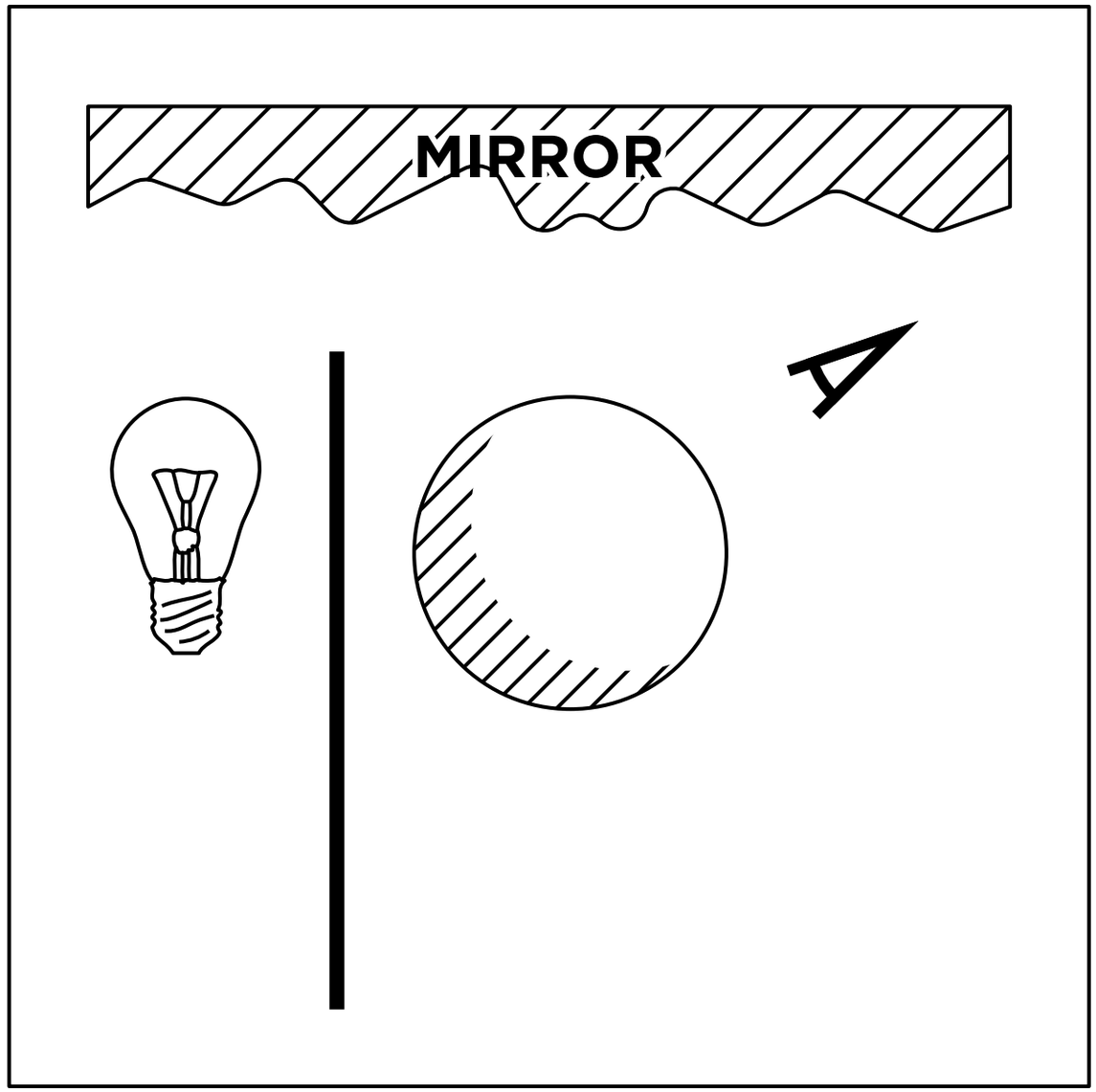


LSDE



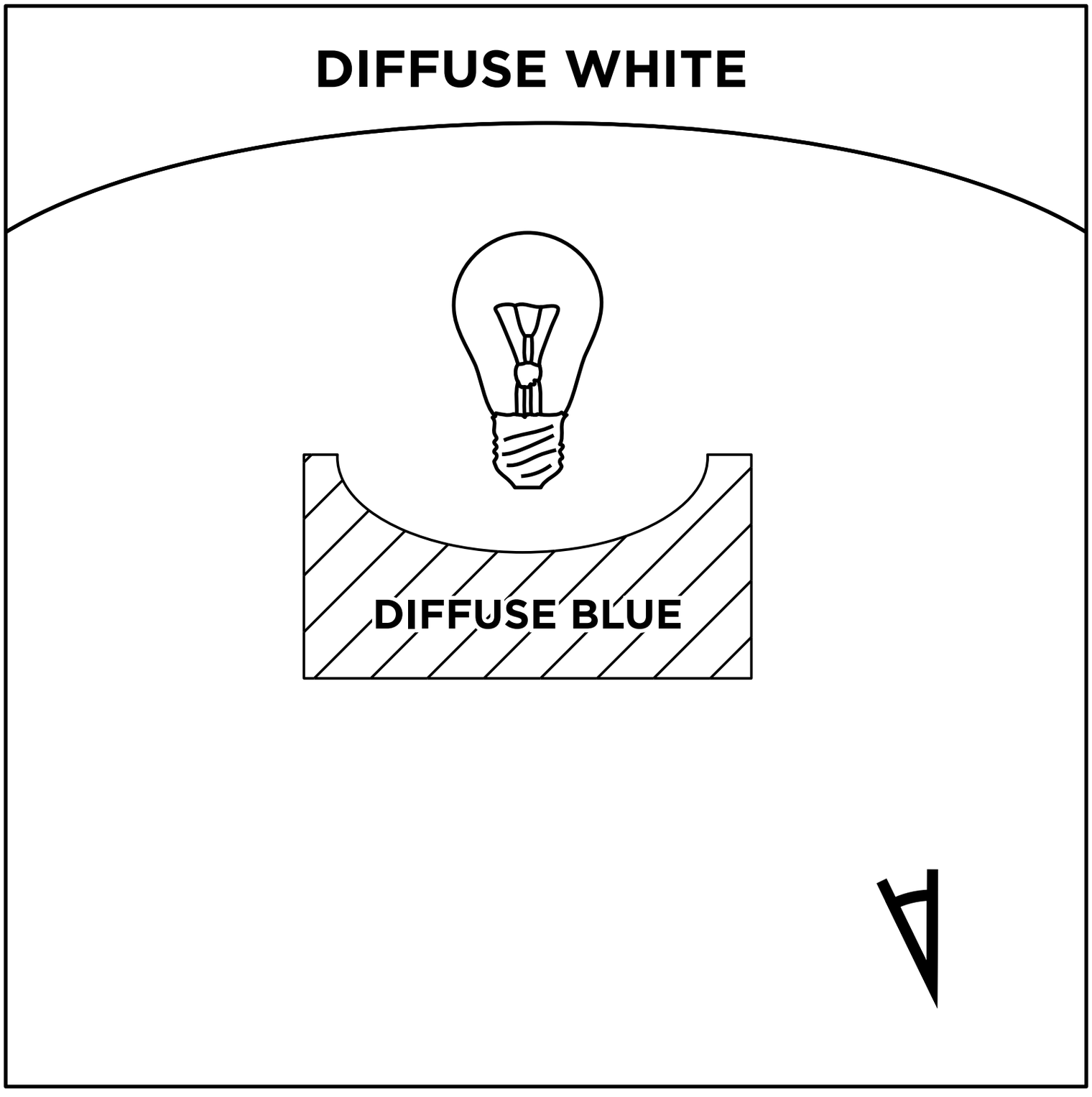
LSDE

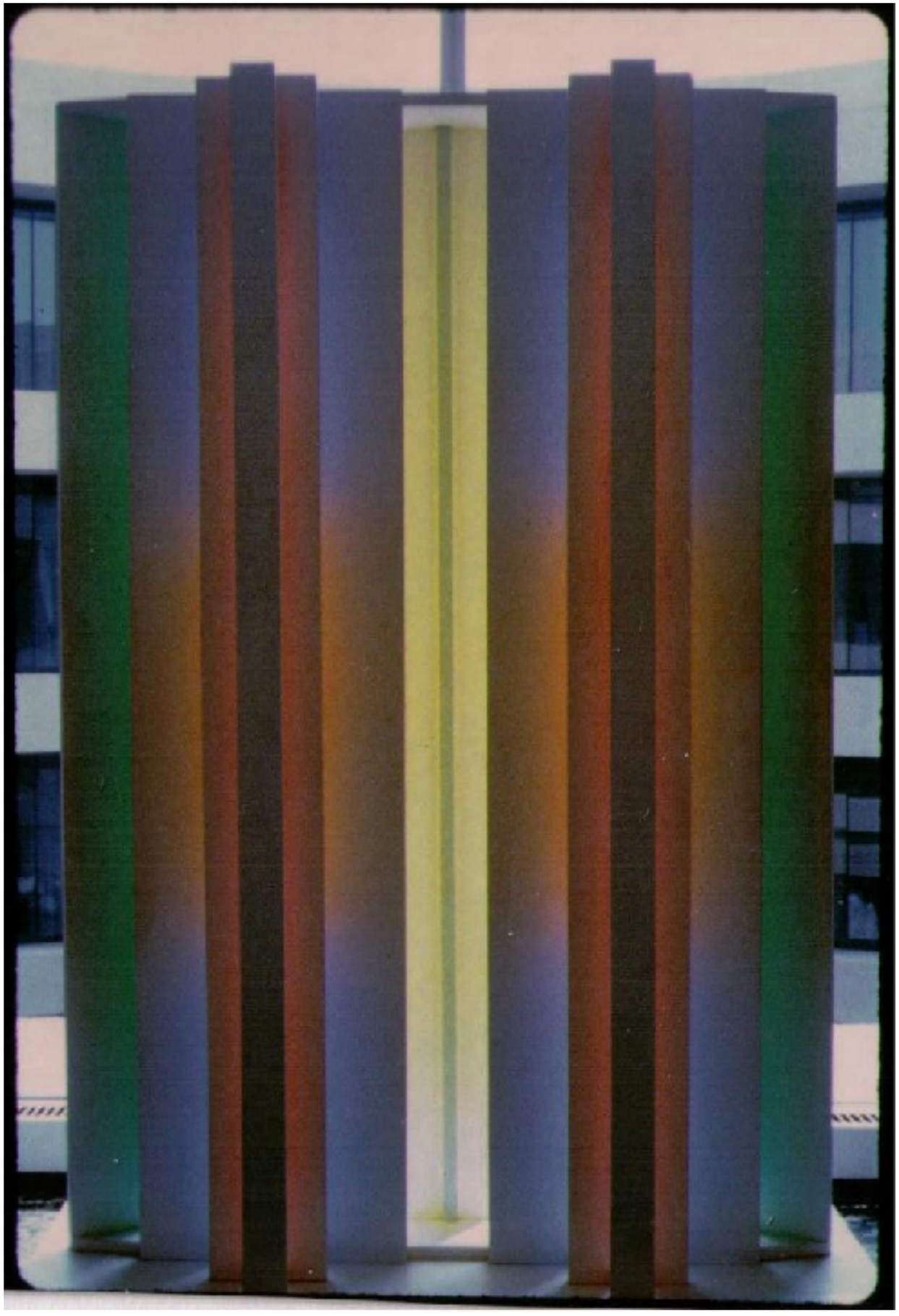




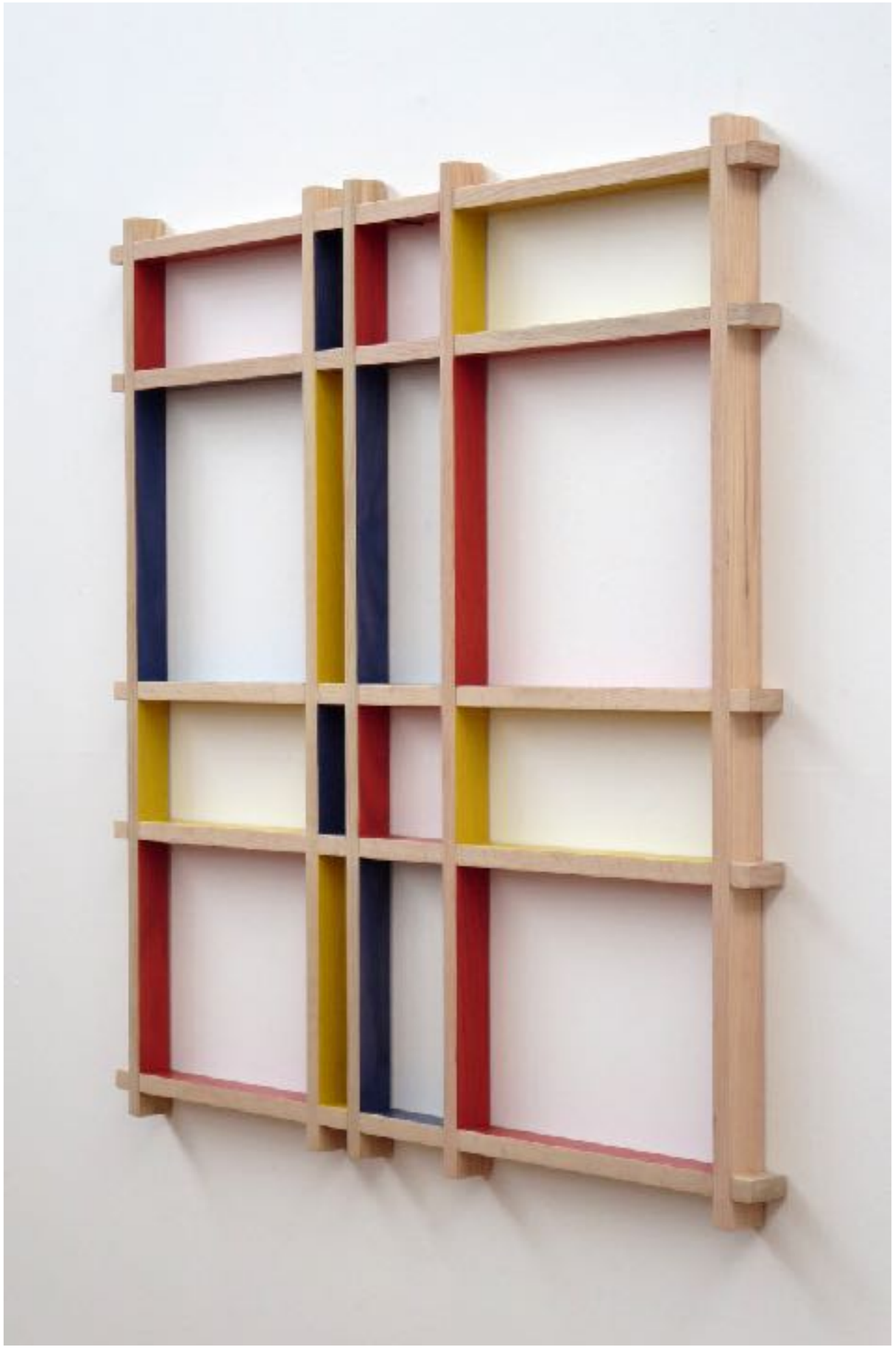
Caustics

LDDE

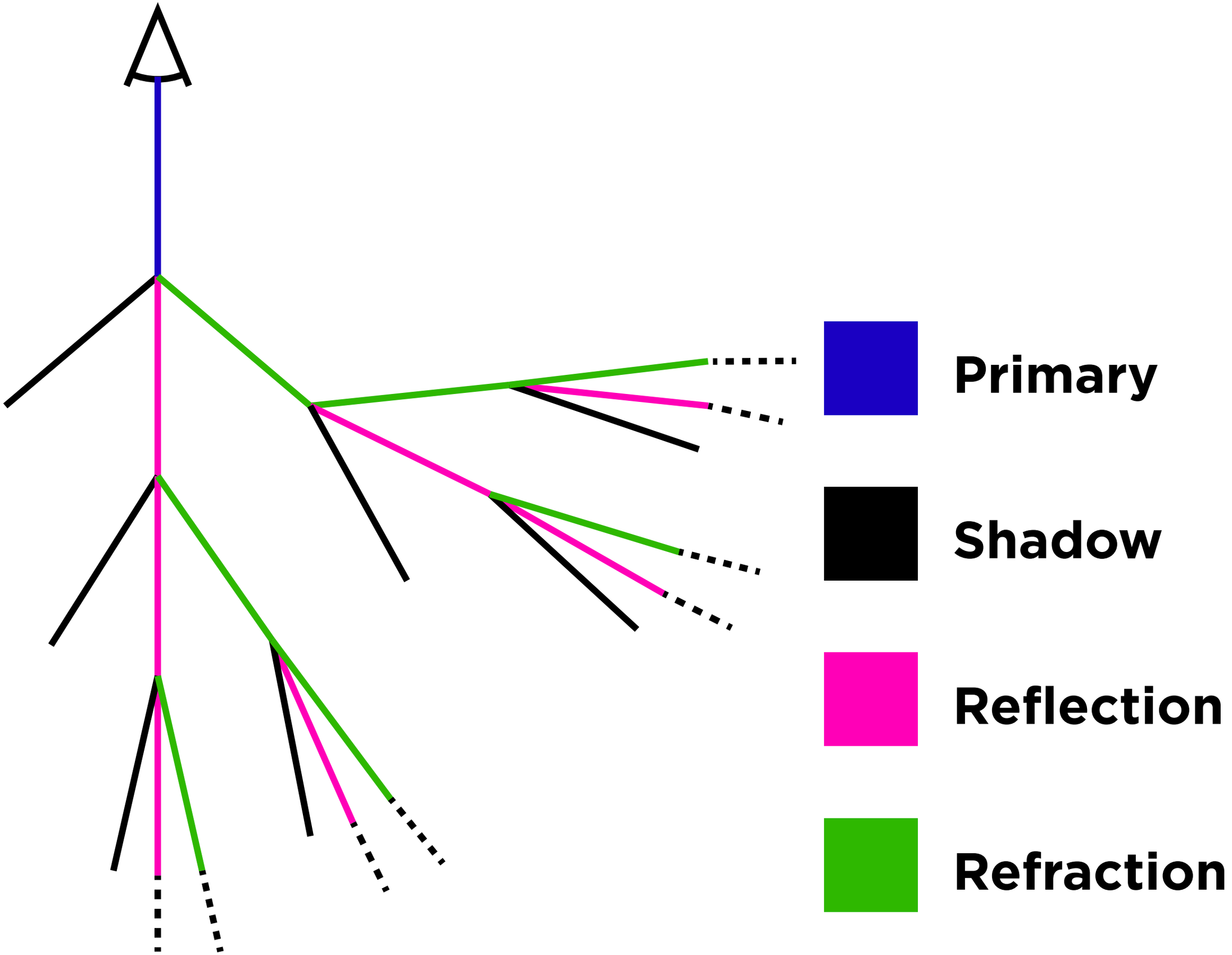


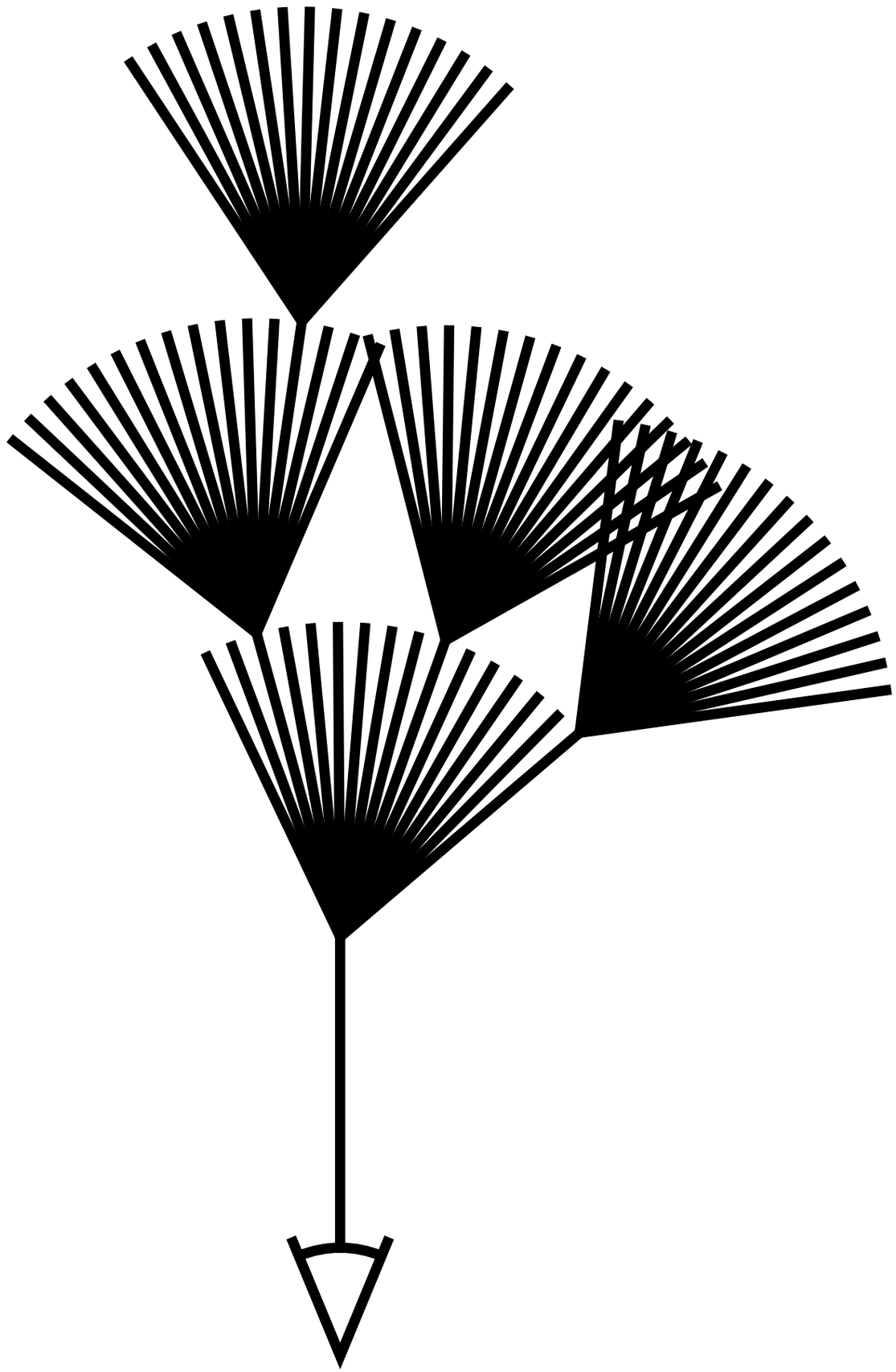


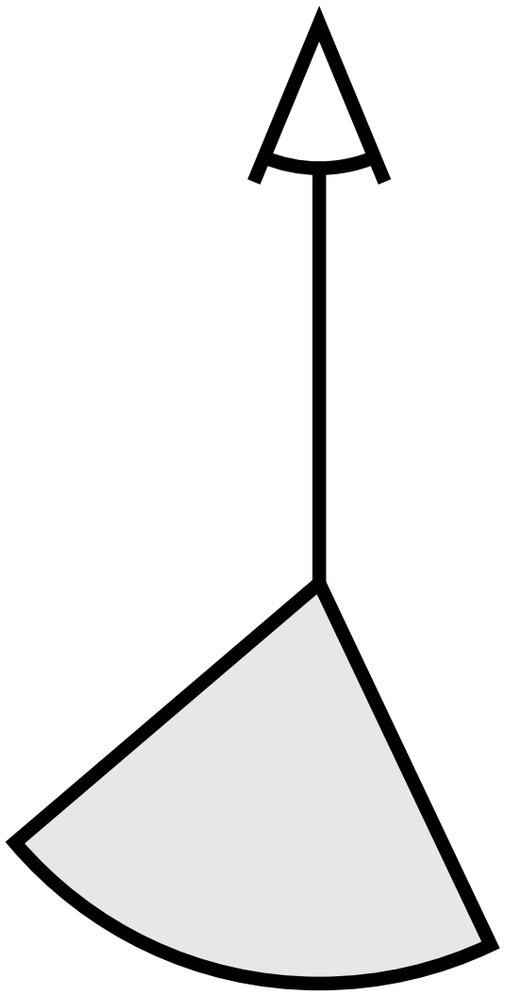
John Ferren,
Construction in Light, a Daylight Experiment
(1968)

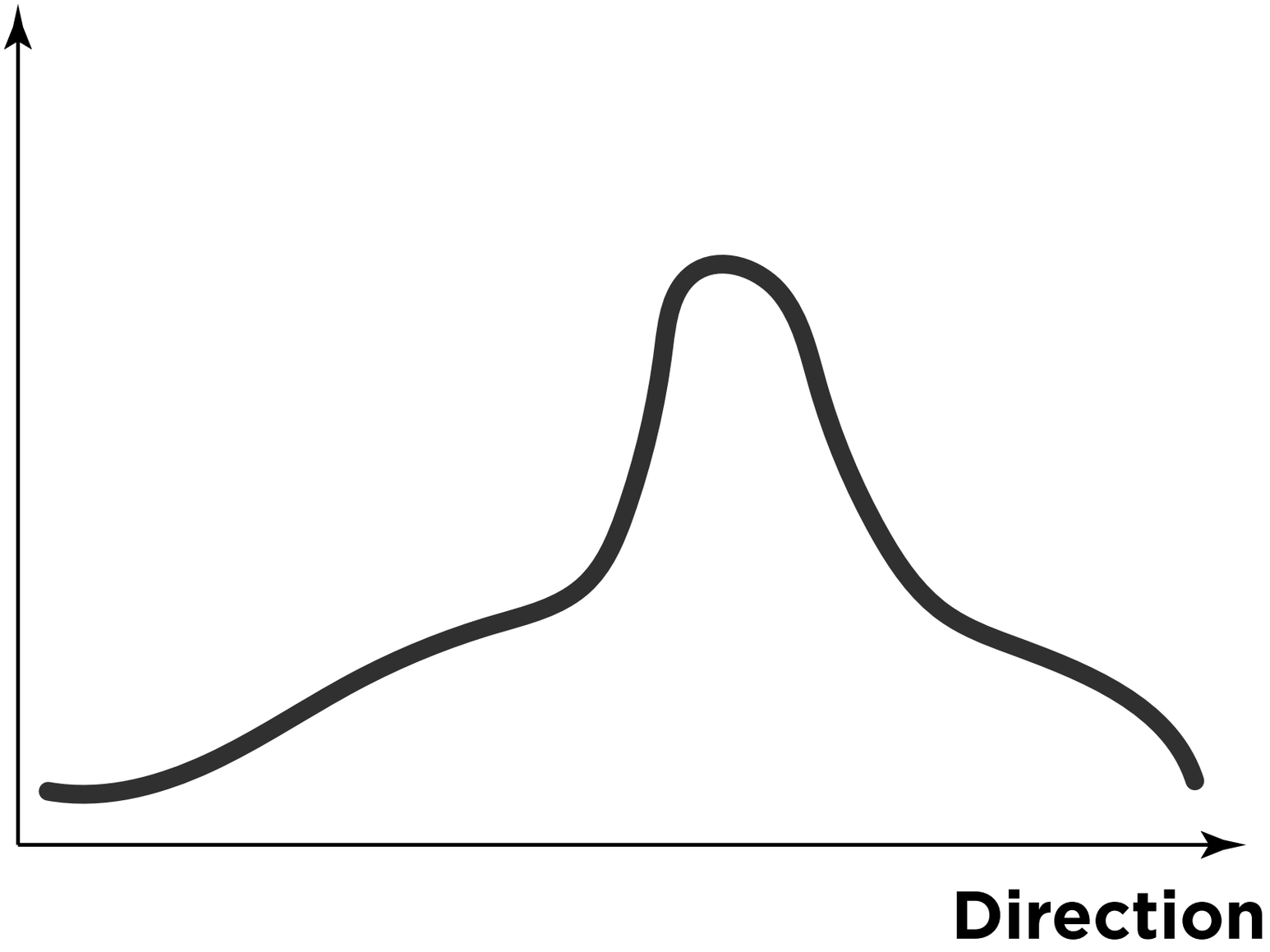


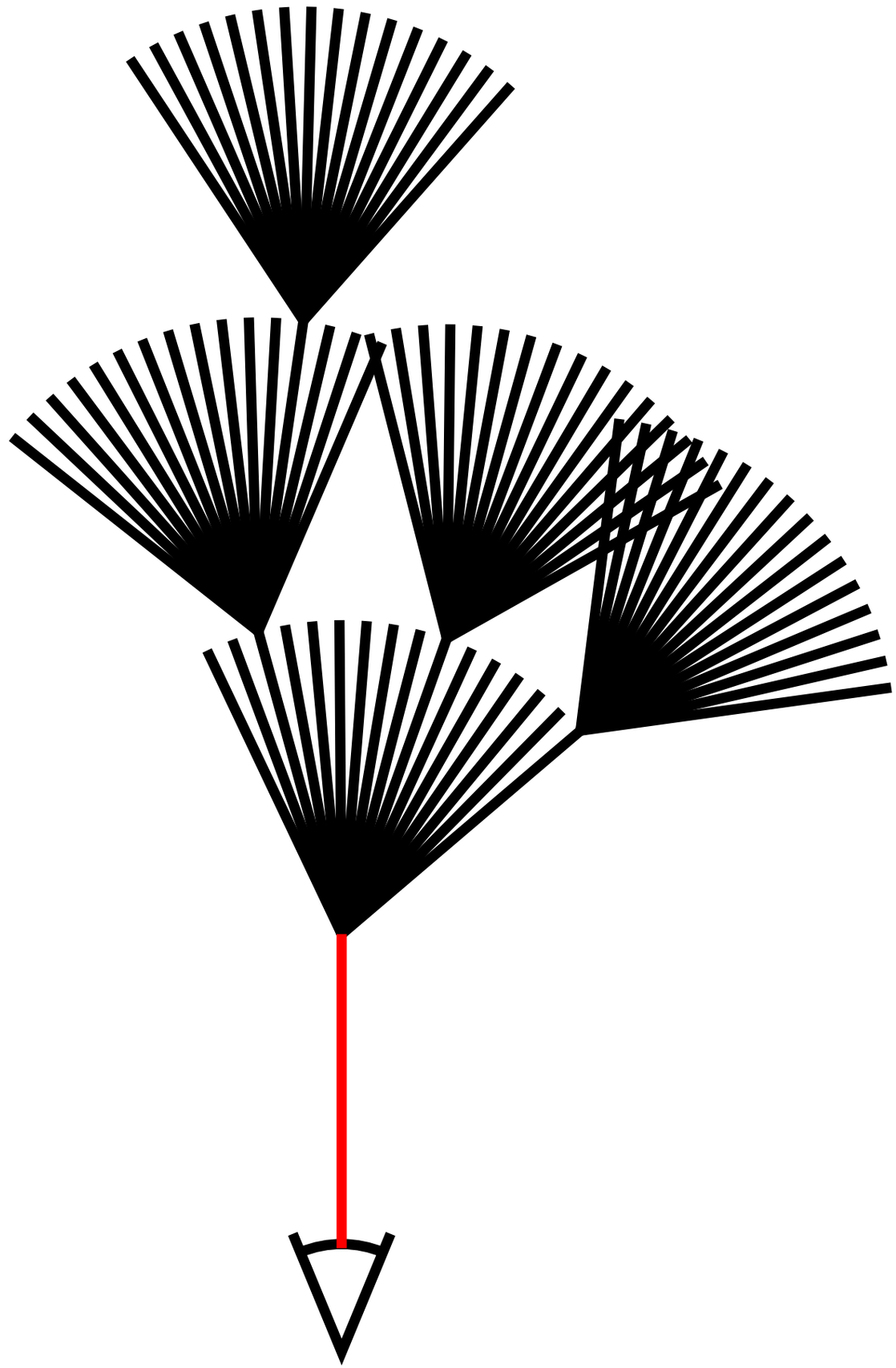
Kevin Burns,
Budapest (2014)

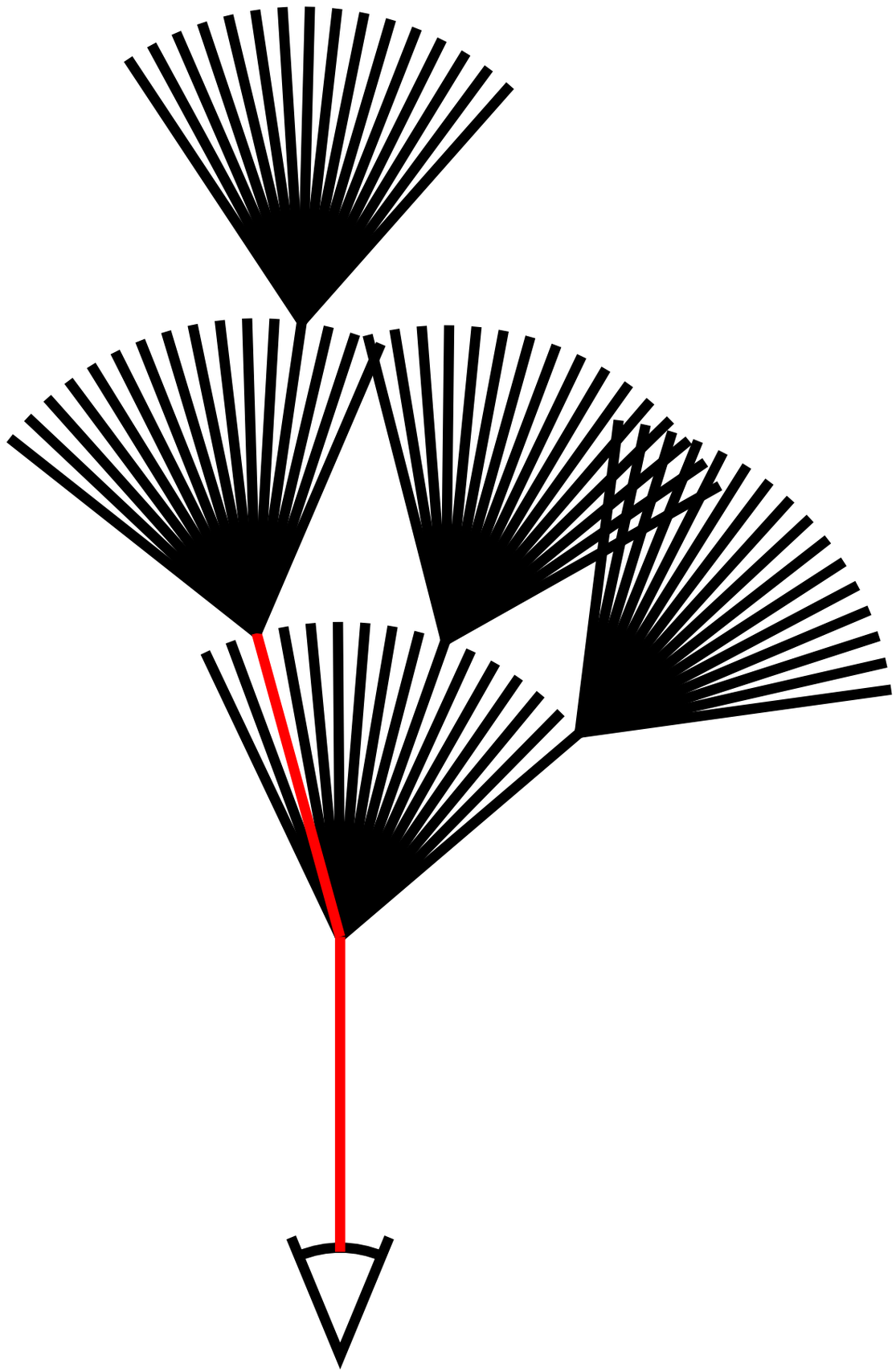

Primary
Shadow
Reflection
Refraction

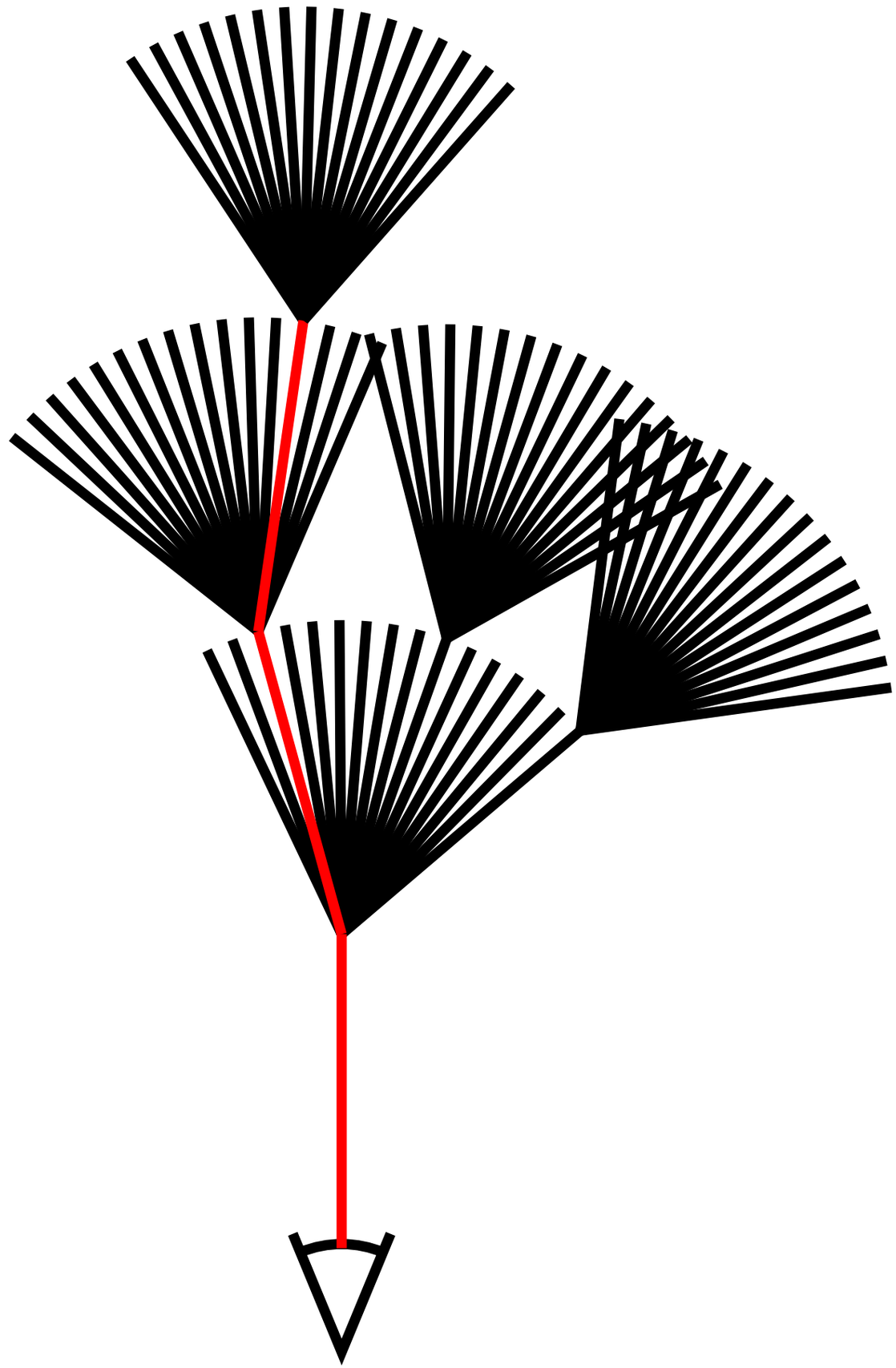


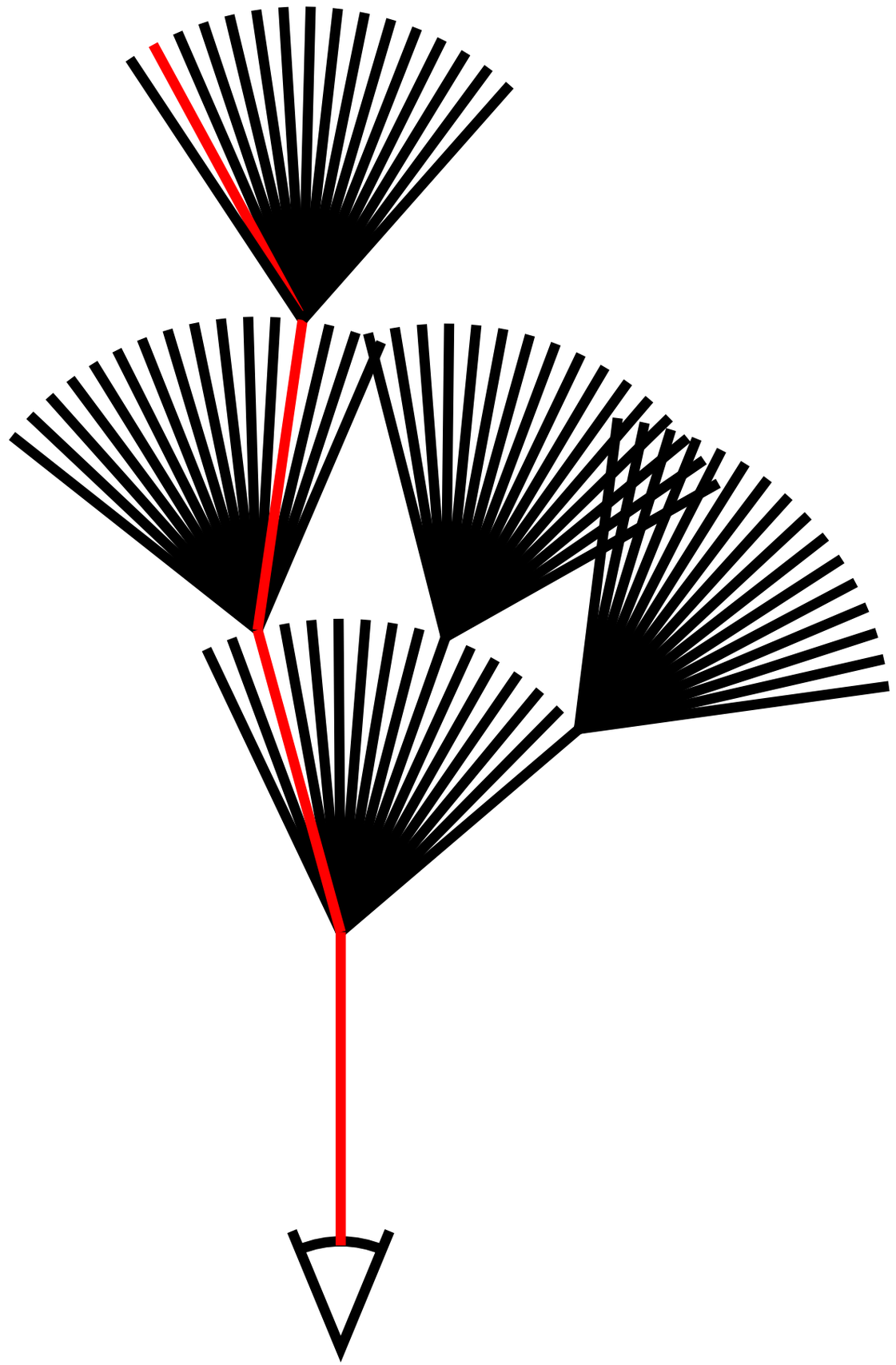


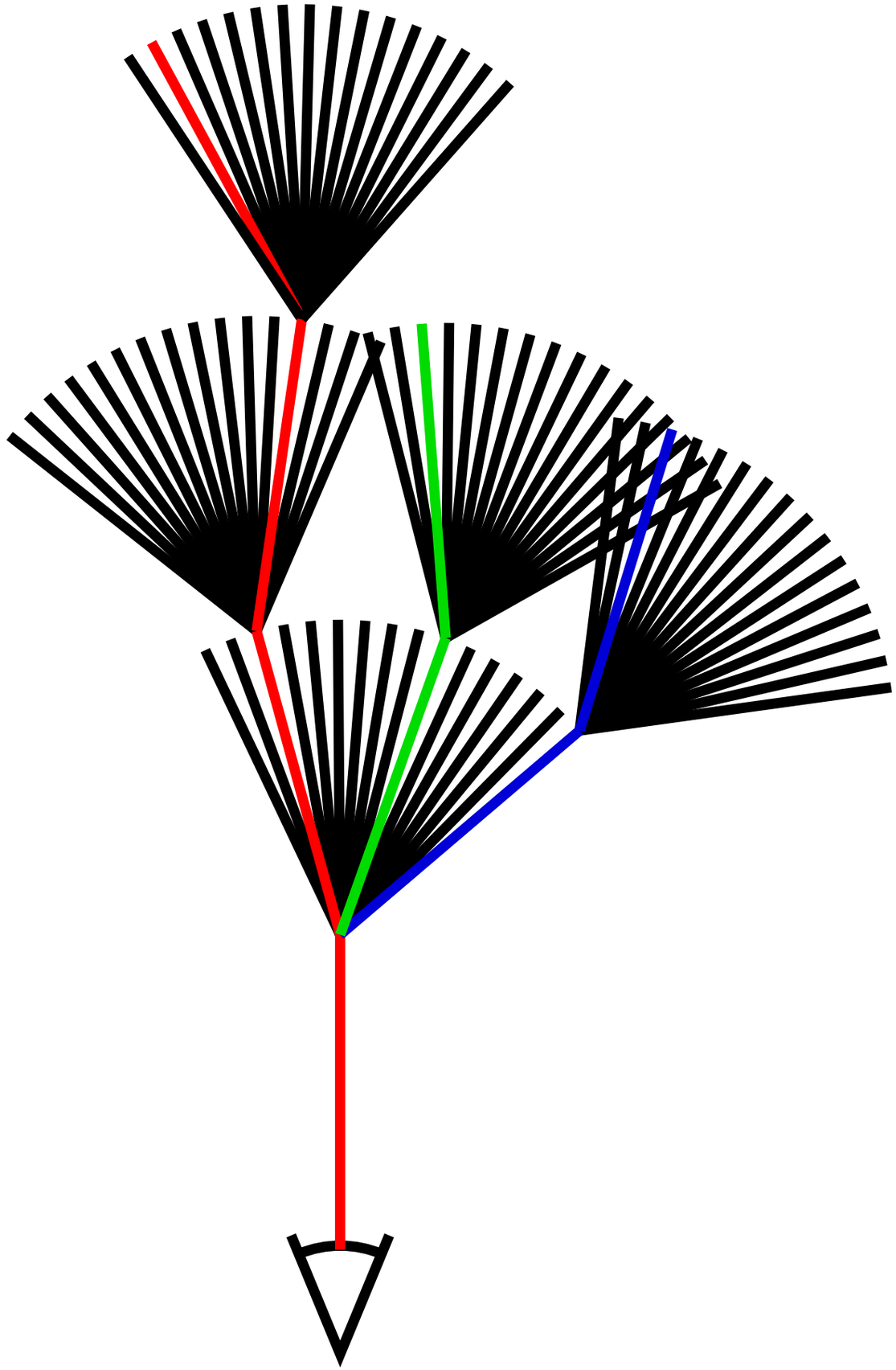

Probability
Direction



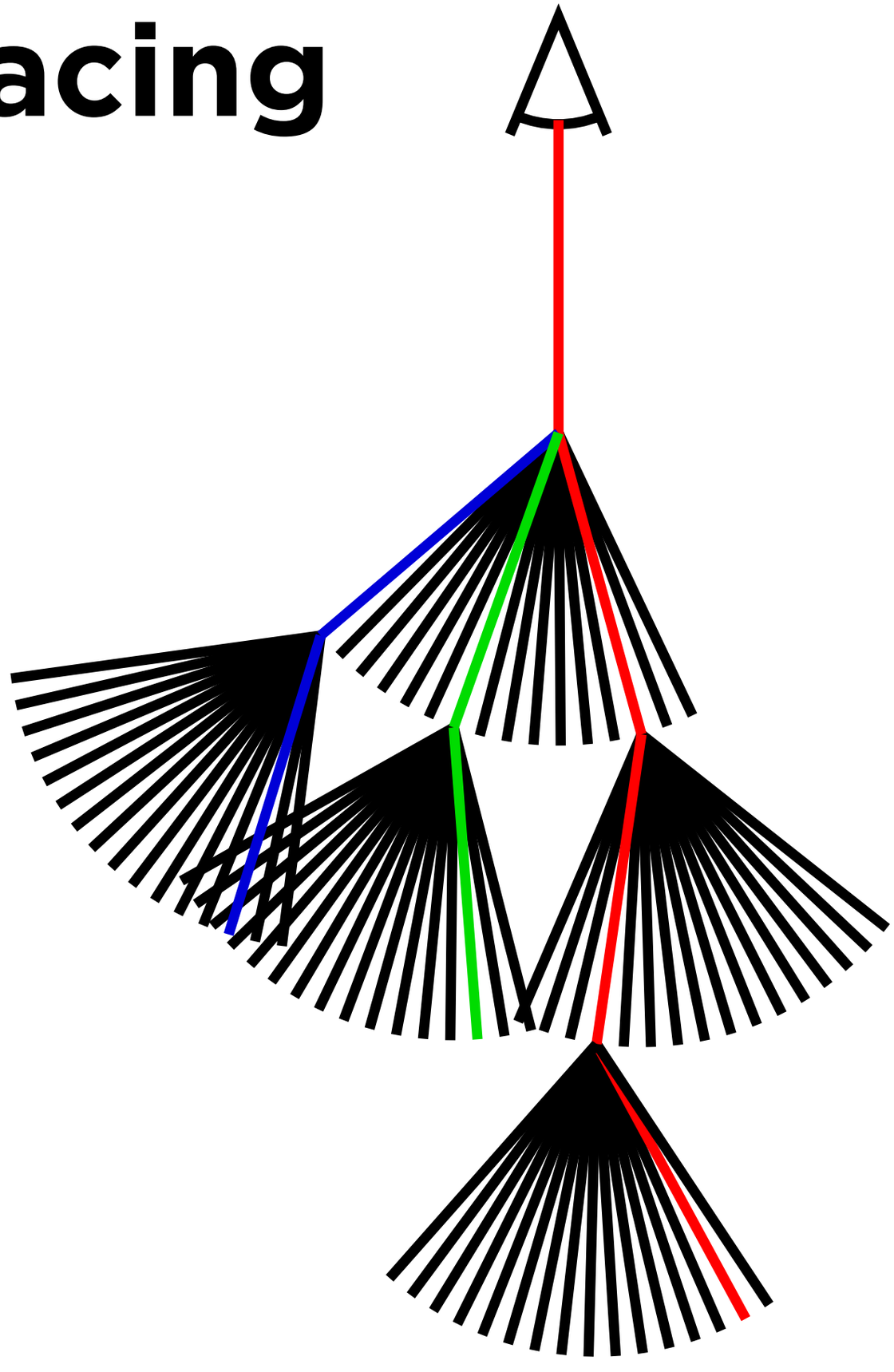


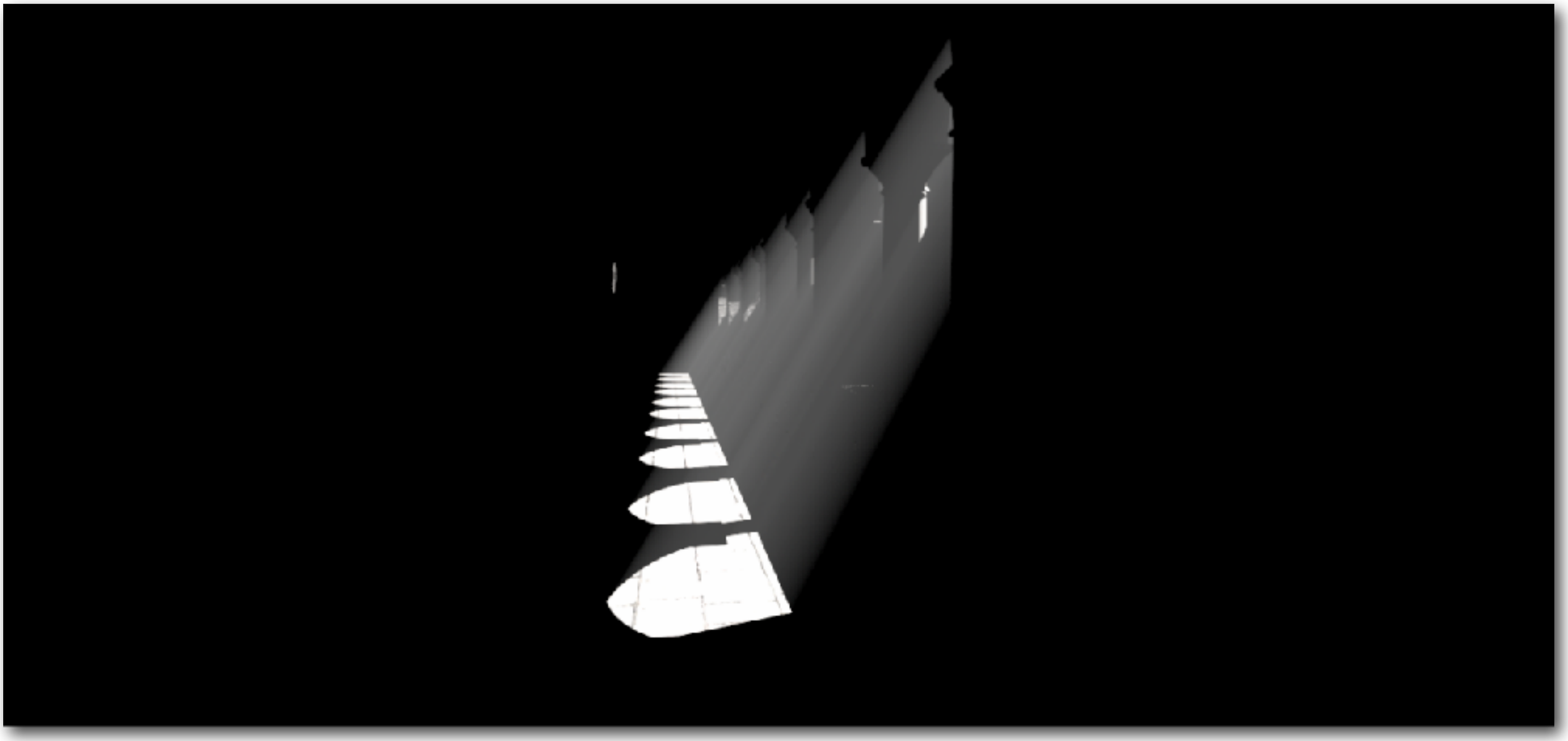




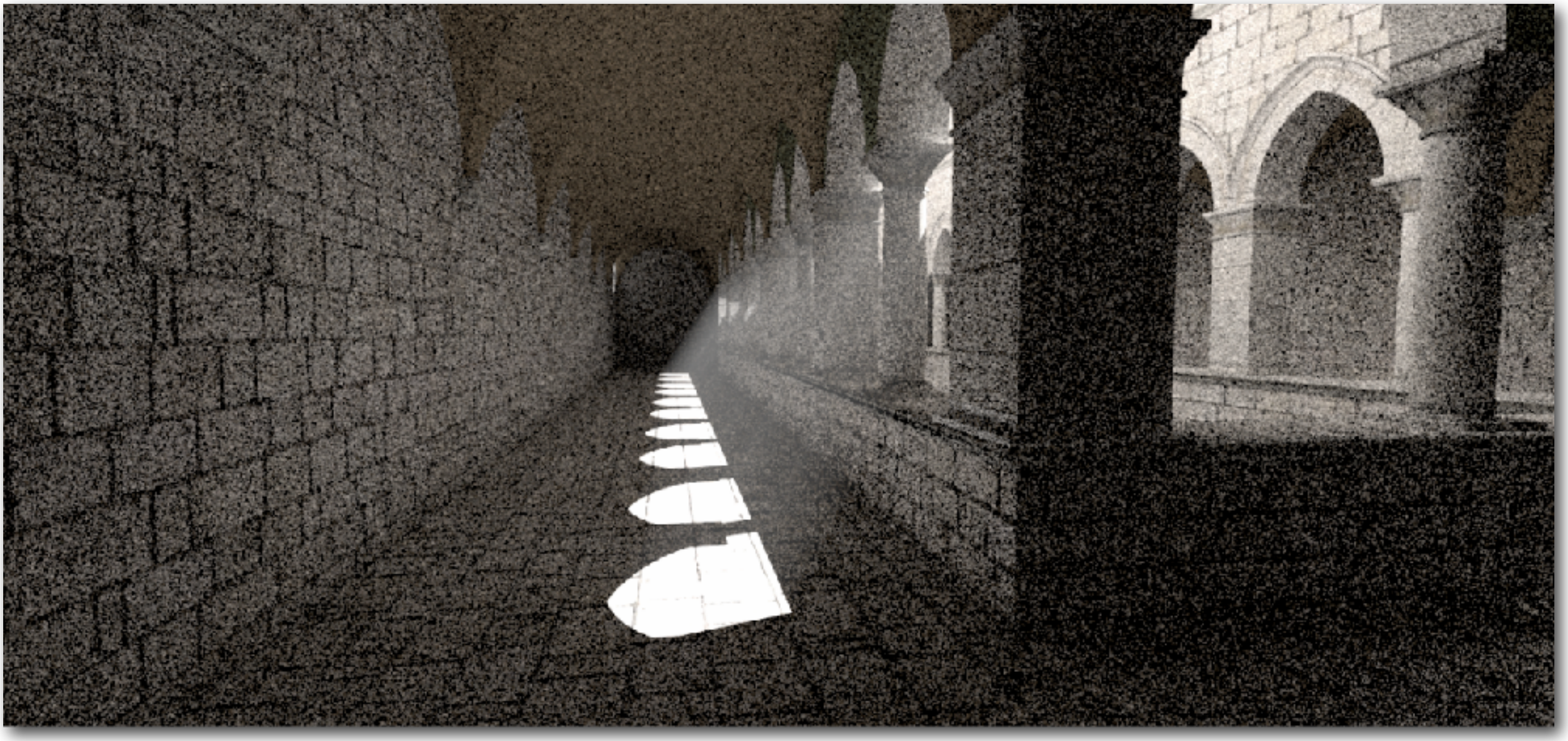


Path tracing





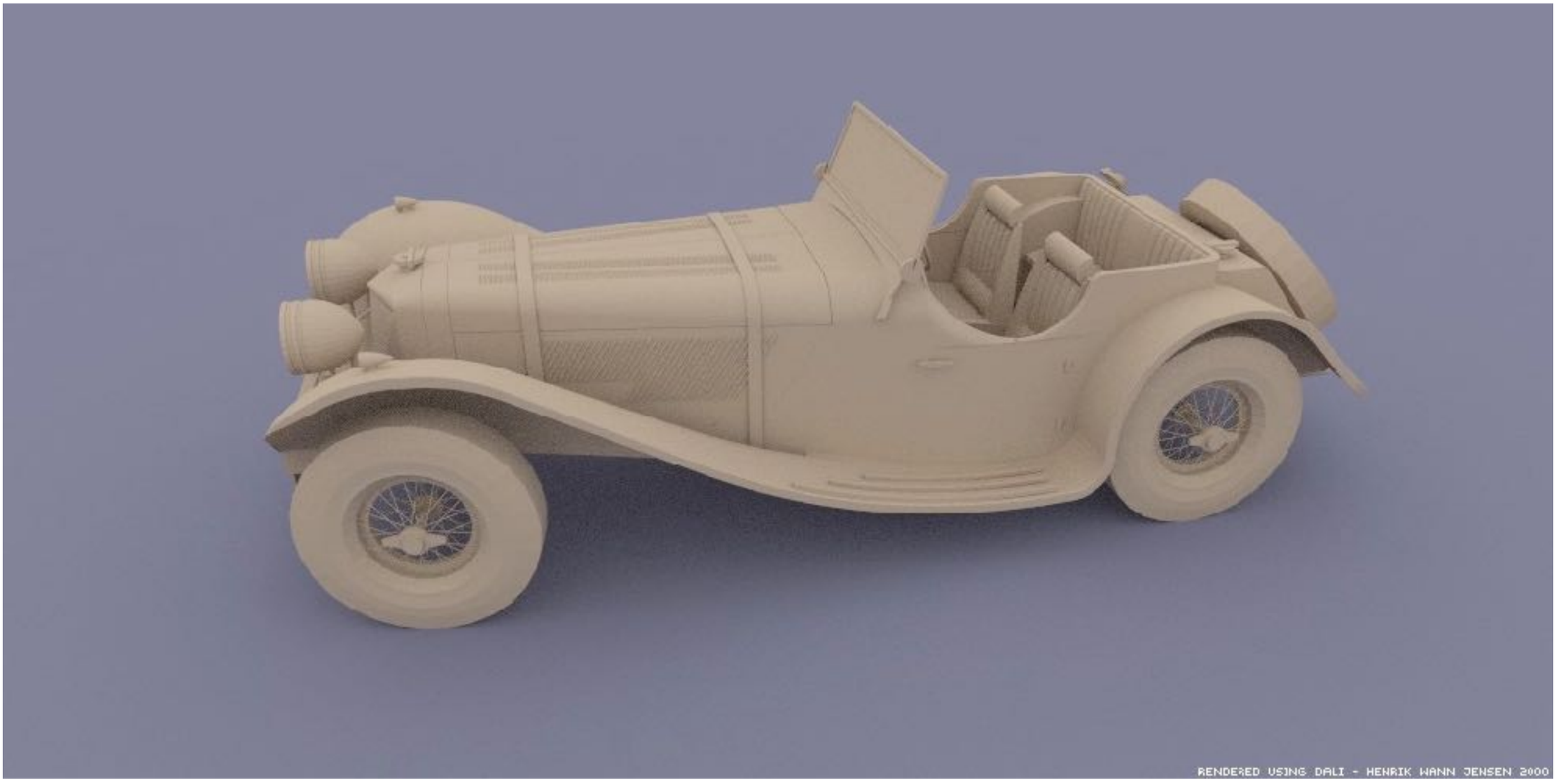
Direct lighting only



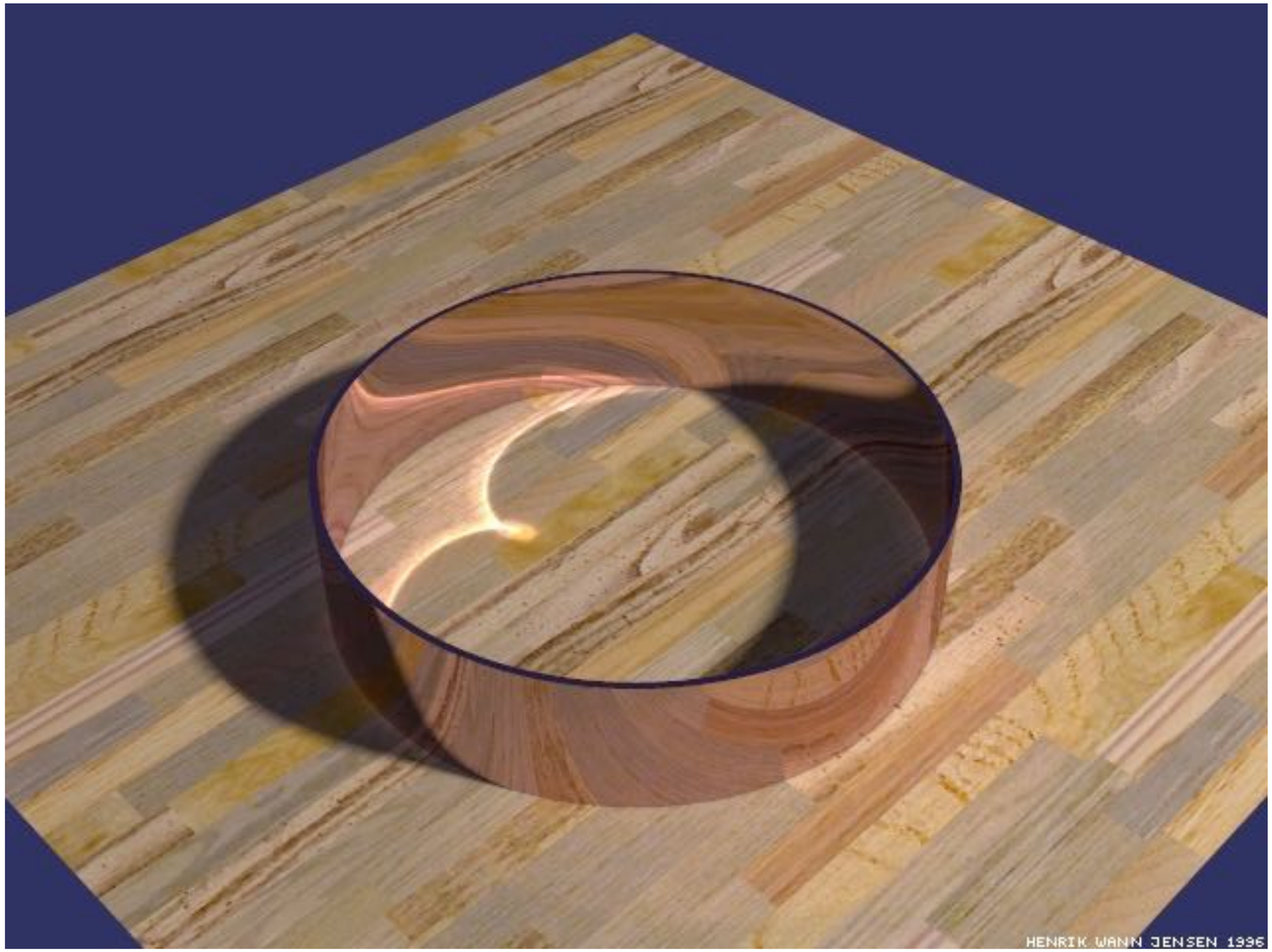
8 paths per pixel

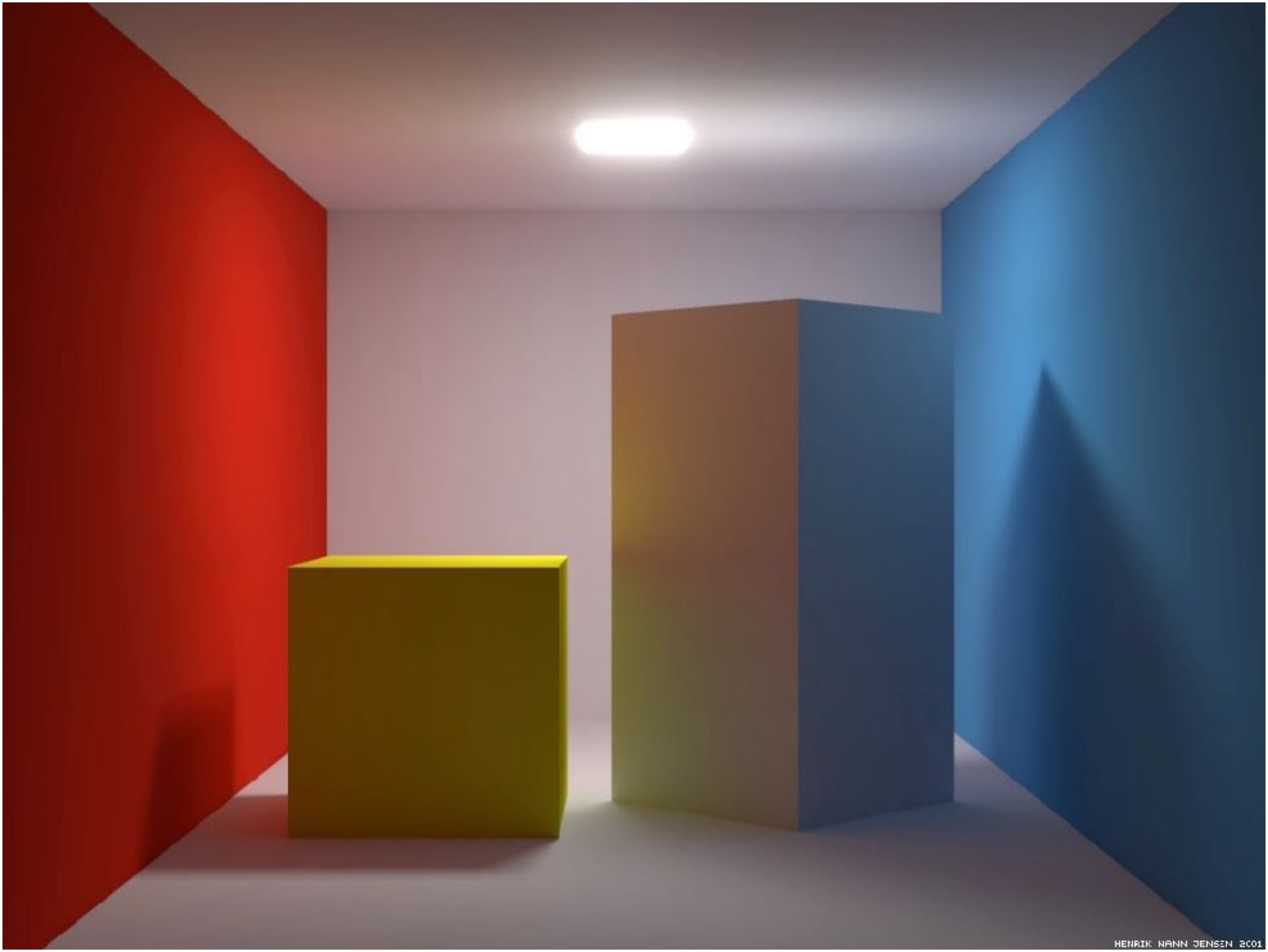
1024 paths per pixel

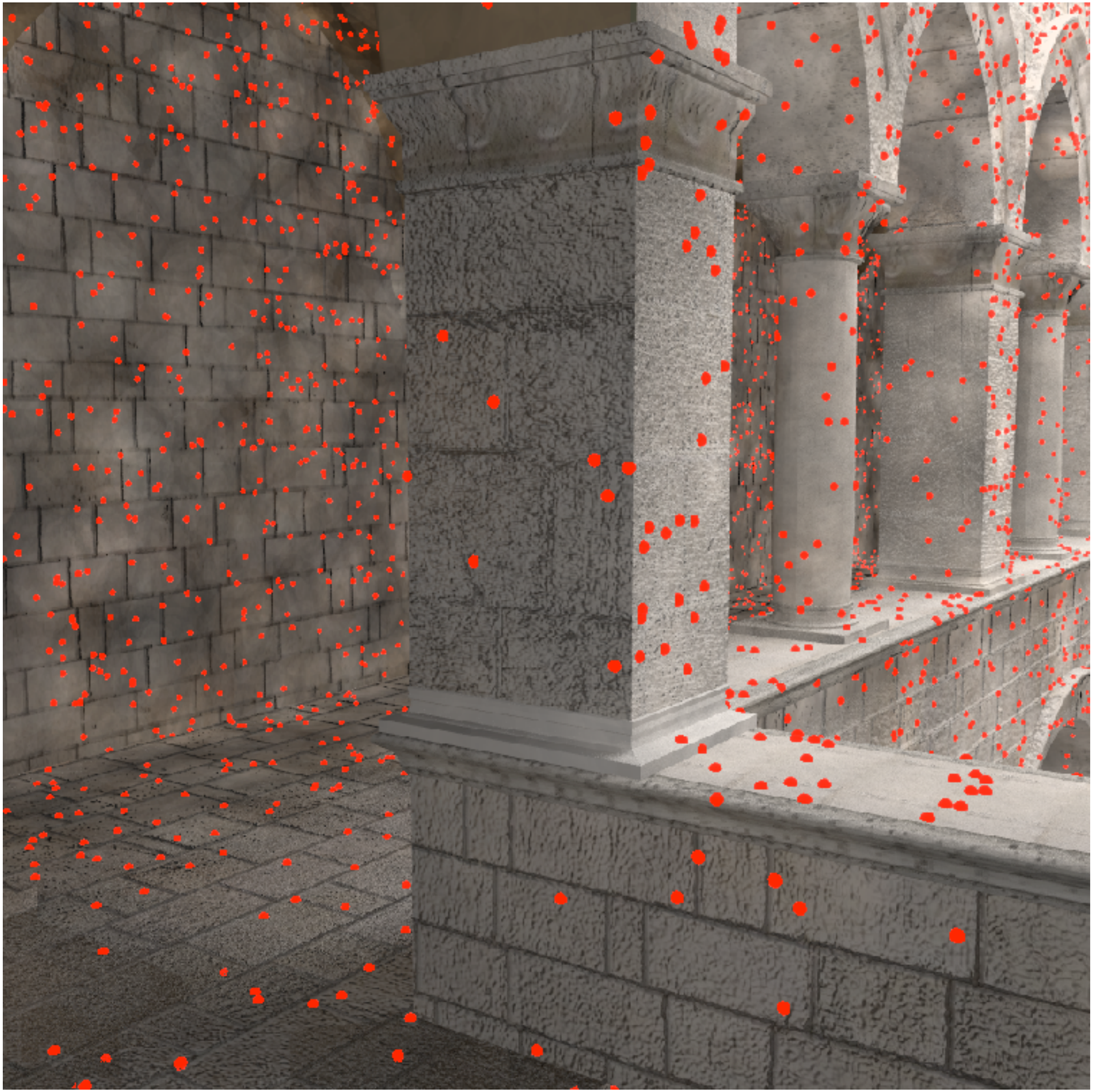
Path tracing

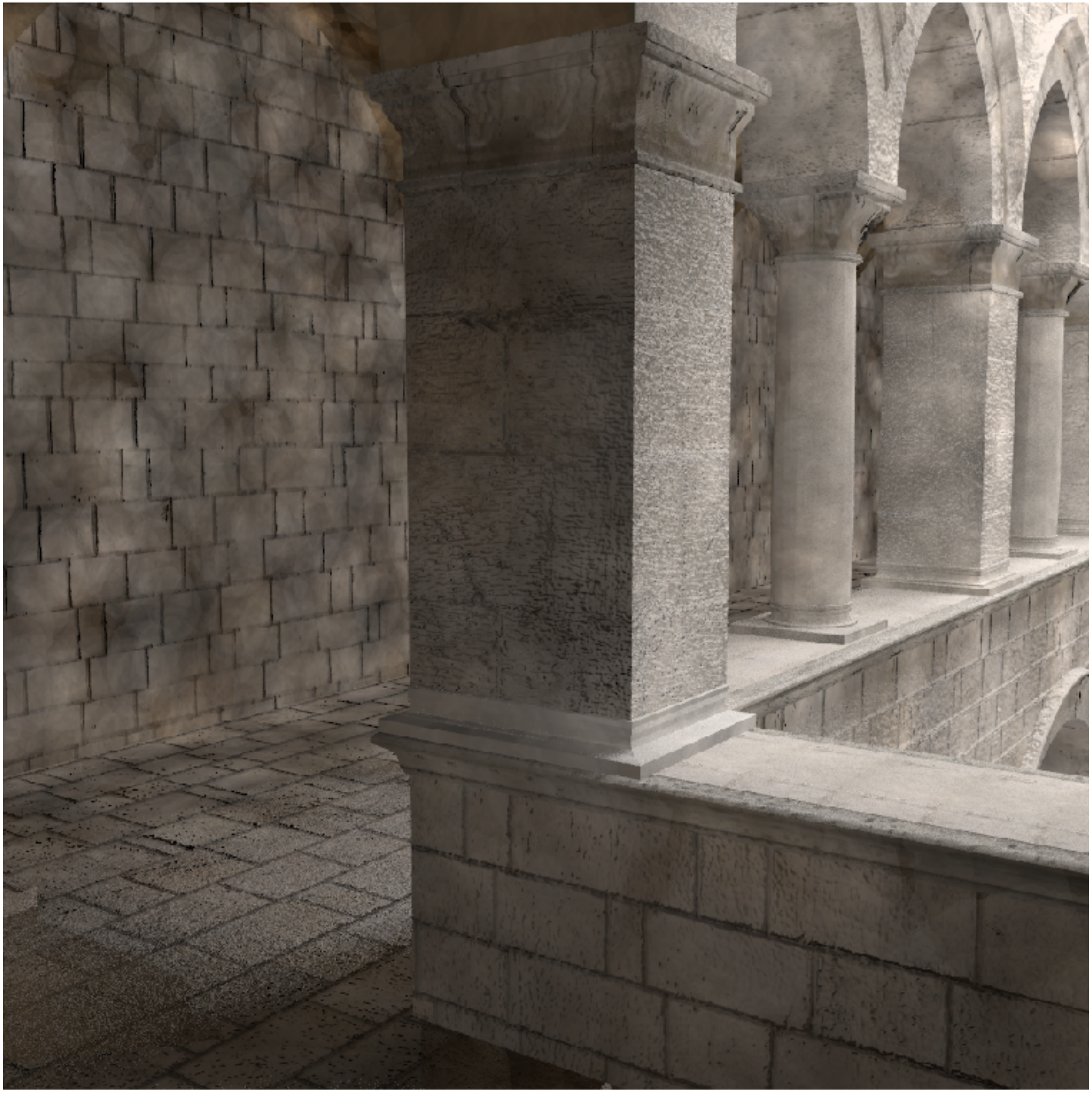


Photon mapping



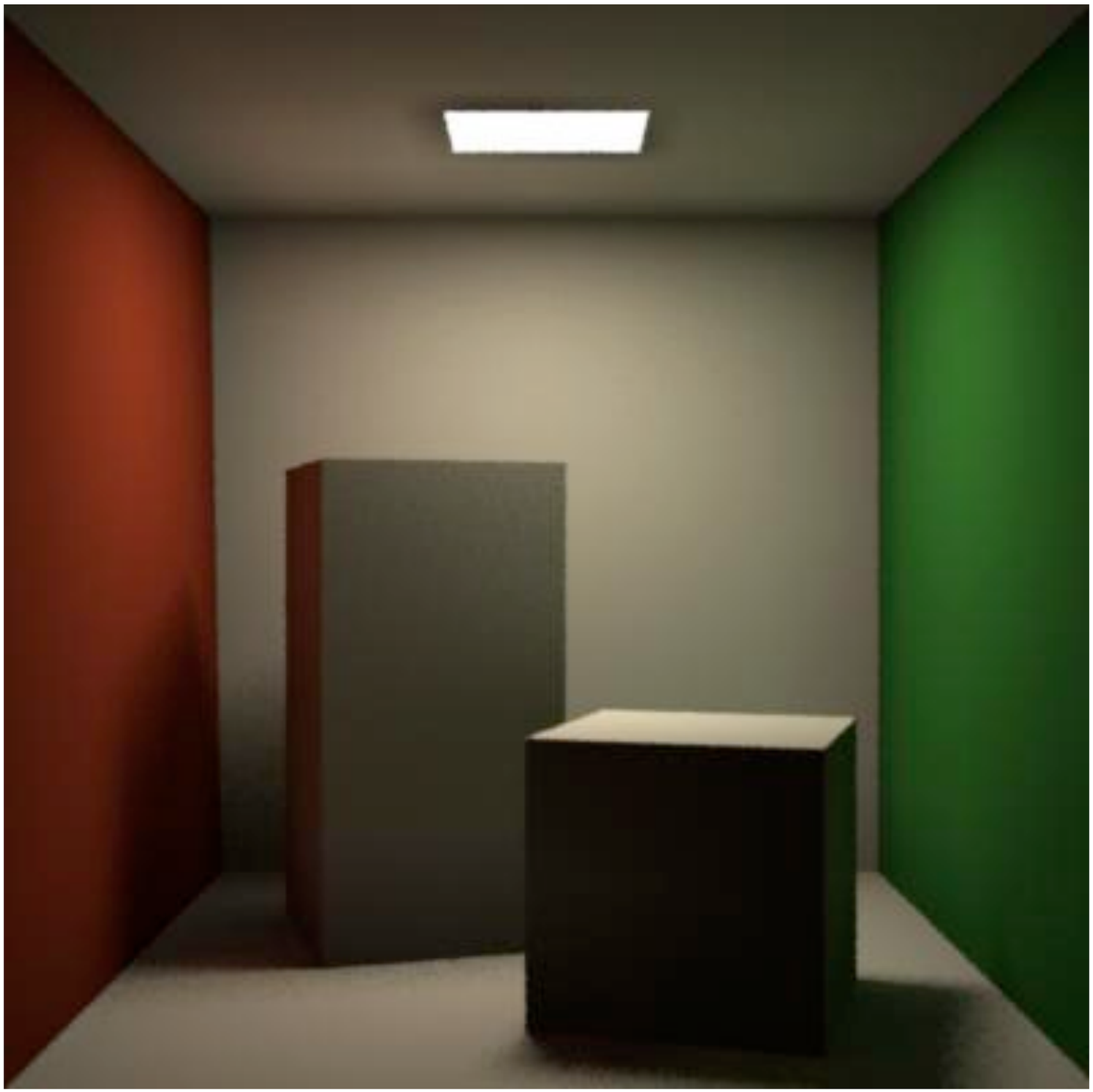

HENRIK WANN JENSEN 2001





Subsurface scattering

Radiosity

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