



Rendering Algorithms

Something Old and Something New

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Motivation



Something Old and Something New

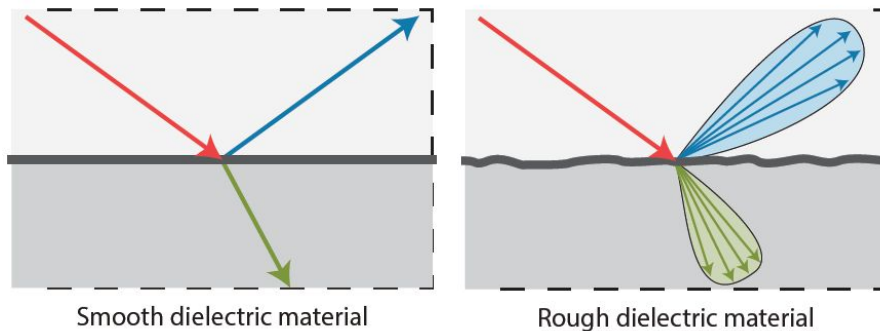


Features

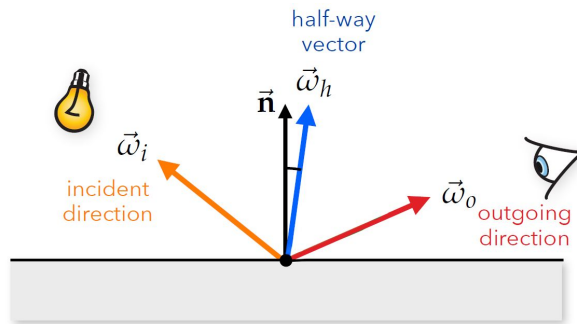
- ❖ Rough Dielectric
- ❖ Transparent paper
- ❖ UV Texture
- ❖ Environmental Lighting
- ❖ Participating Media

Features: Rough Dielectric

- Fresnel coefficient: fr
- Beckmann distribution
 - wh (half-way vector)

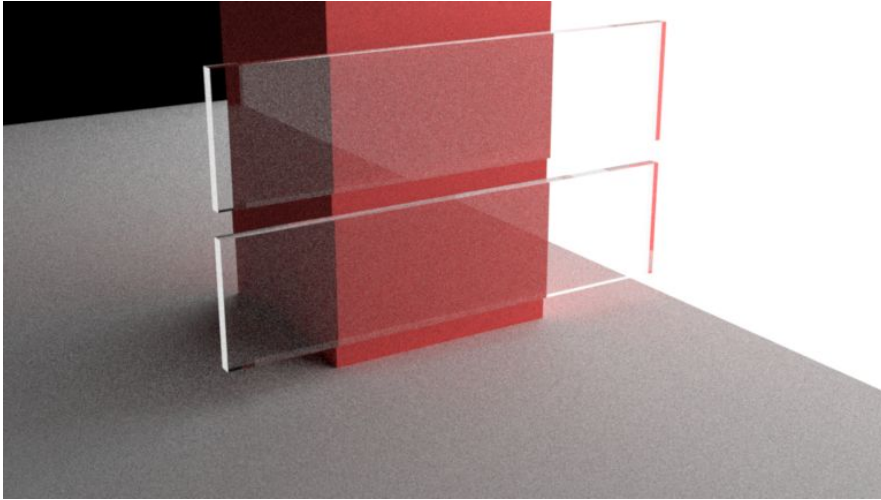


```
if (fr < rand()) {  
    /* reflection */  
    wo = 2 * wh * wh.dot(wi) - wi;  
}  
else {  
    /* refraction */  
    wo = eta * -wi + (eta * cosThetaI - cosThetaT) * wh;  
}
```

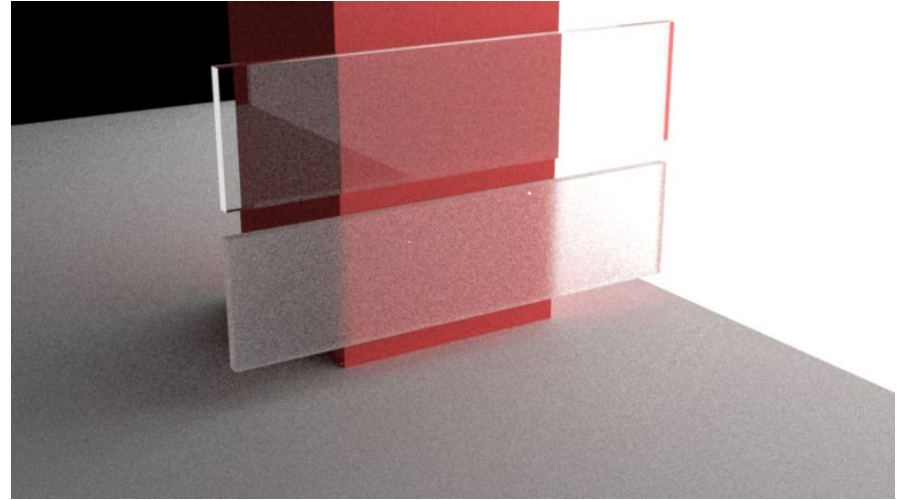


Features: Rough Dielectric

Dielectric



Rough Dielectric

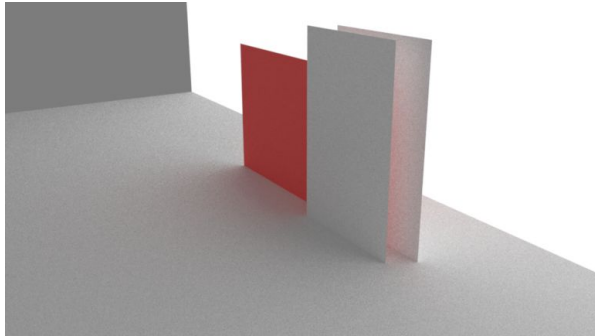


The roughness value of rough dielectric is seated to 0 (top) and 0.5 (button).

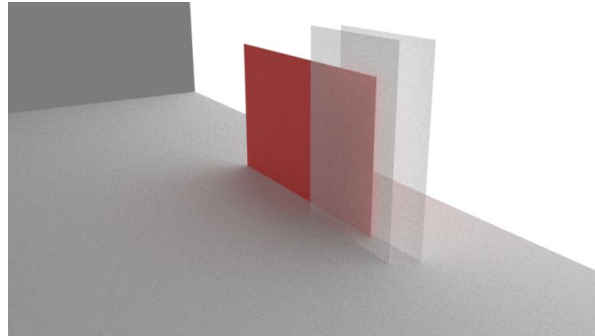
Features: Paper

- Define a transparency value

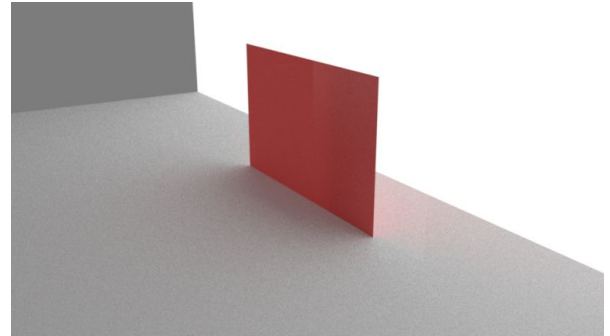
```
if (rand() < transparency)
    // light pass through
else
    // normal diffuse using cos weight
```



Transparency = 0



Transparency = 0.5



Transparency = 1

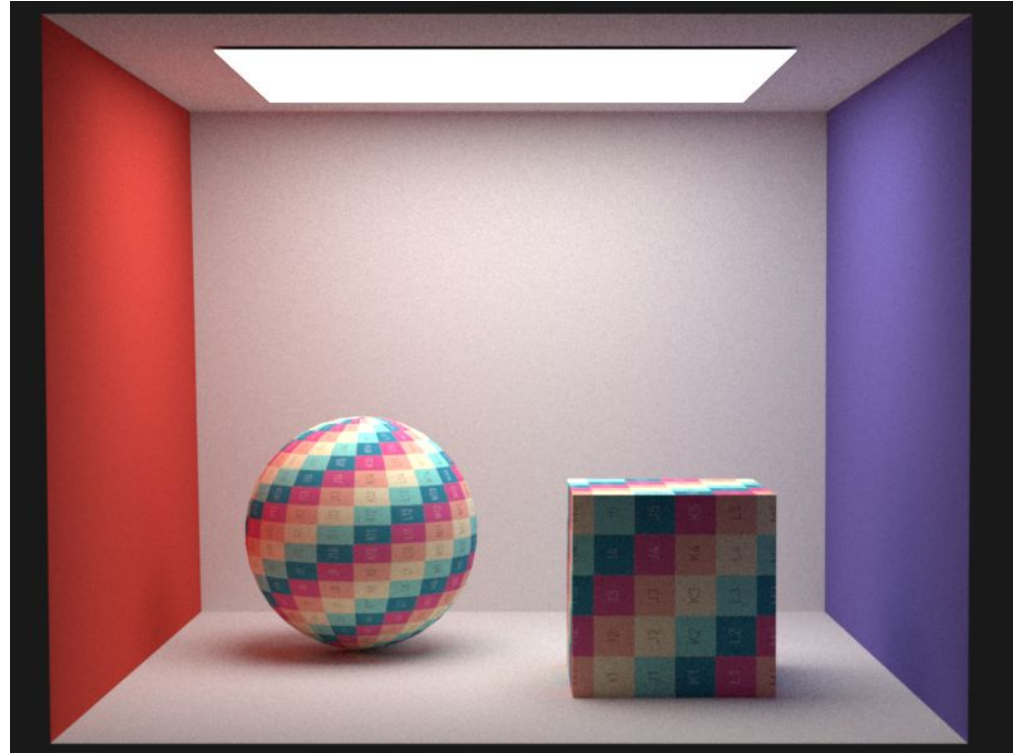
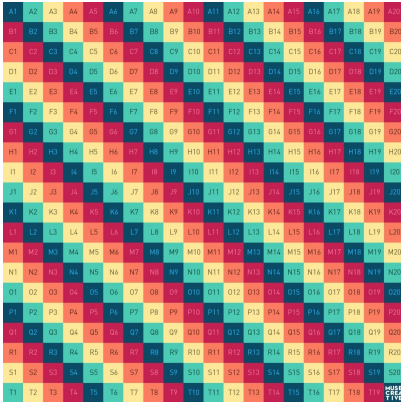
Features: Paper

Paper with texture



Features: Texture

- UV texture
- Can load .exr, .png and etc.



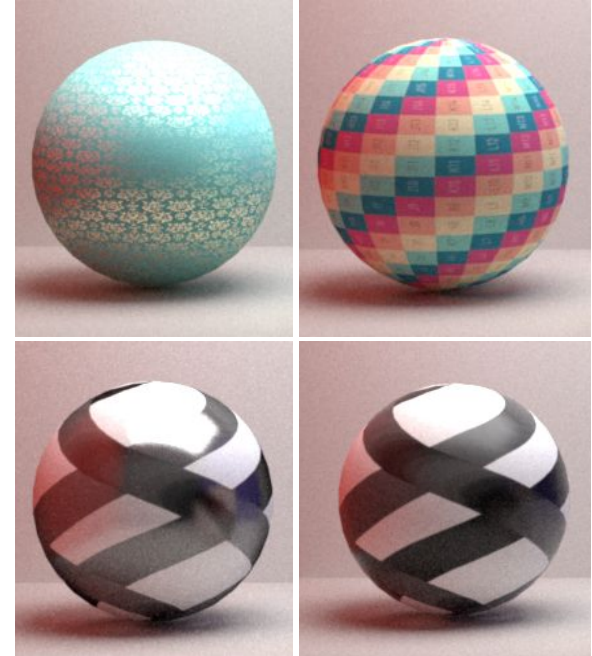
Features: Texture

❖ Albedo texture

- Diffuse
- Blinn
- Paper
- Microfacet

❖ Other texture

- Microfacet dielectric (roughness)
- Phong (specular)



Features: Texture

Specular texture

Blinn with texture

Diffuse with texture

Paper with texture

Microfact with texture



Features: Environmental Lighting

- Basic texture lighting
- Only bsdf sampling



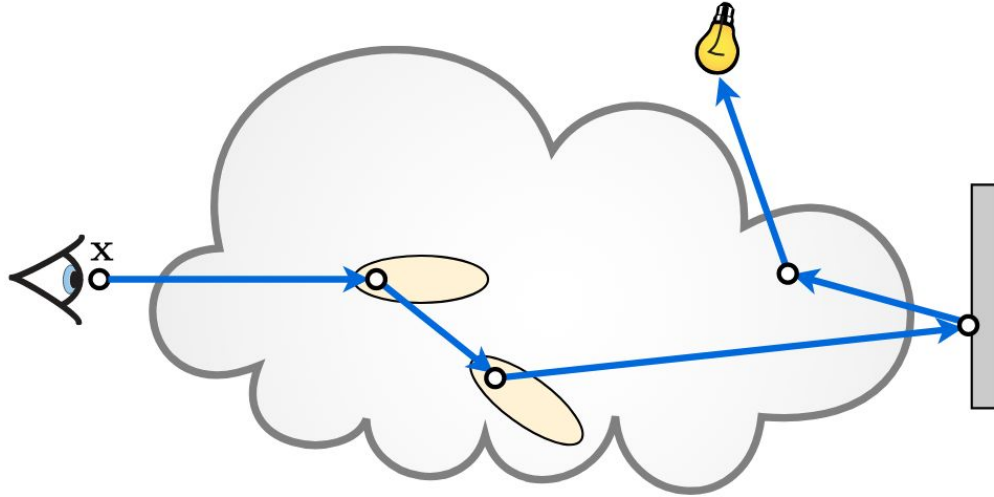
Features: Environmental Lighting

Environmental Lighting



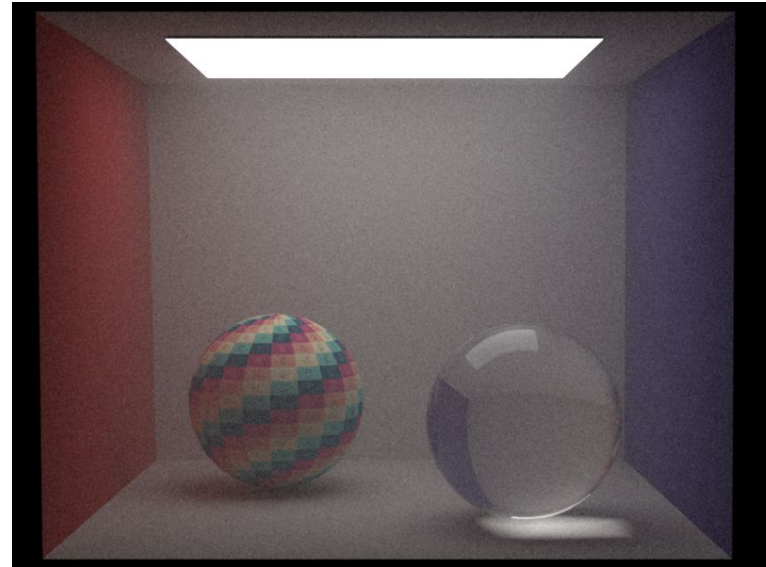
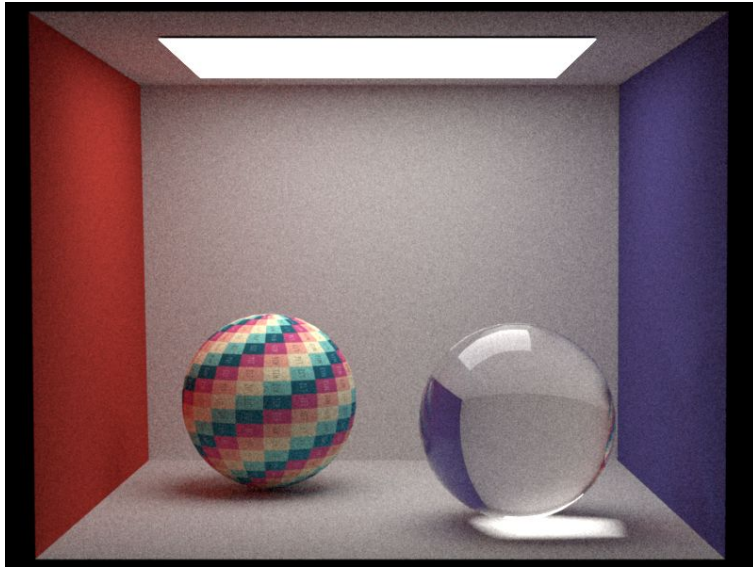
Features: Participating Media

- Volumetric path tracing
- Homogeneous media
- Can attach to scene or to a mesh



Features: Participating Media

Medium attached to a scene



Features: Participating Media

Medium attached to a mesh



Features: Participating Media



Participating media

Final Image



Question?

