20220719 Project Meeting

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PEARL ABYSS

Contents

PEARL ABYSS

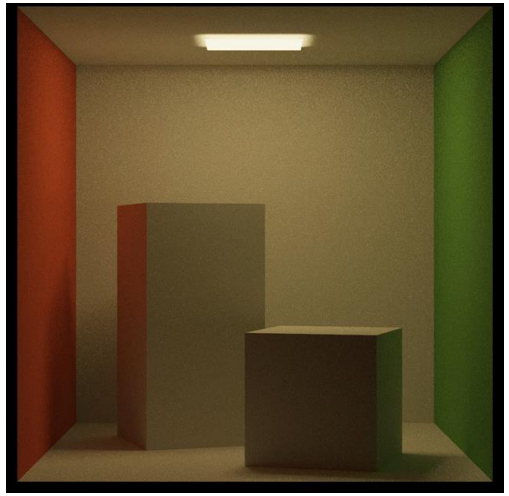
- (3 Week) Work Progress
  - Material implementation
  - Several optimizations
- TODO

Recall - (2 Week) Work Progress

PEARL ABYSS

- Rendering pipeline design (Structured buffer with uv, normal,…)
- Texture loading
- Multiple Importance Sampling (direct light sampling)

w/o MIS



with MIS

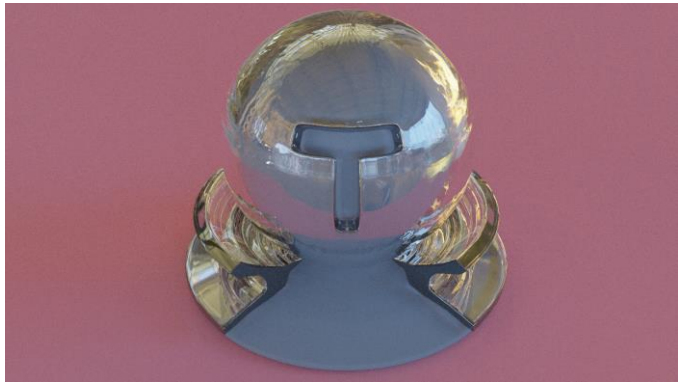
(3 Week) Work Progress

PEARL ABYSS

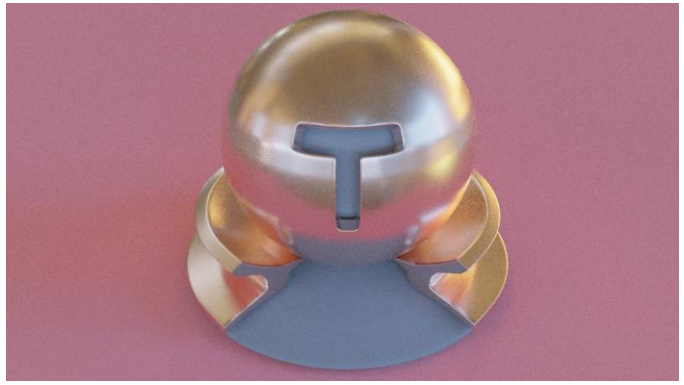
- Implement different materials / environment map

Copper

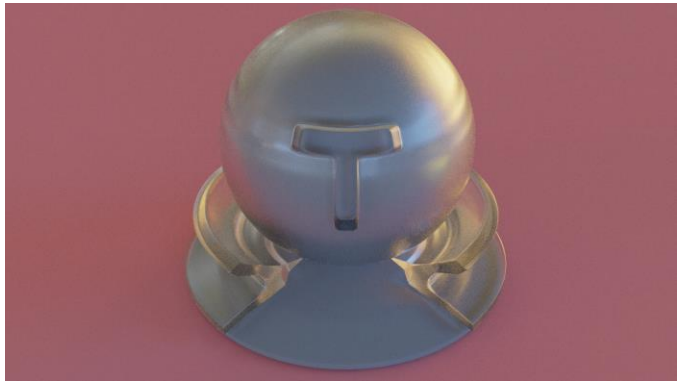
IOR = 1.33 (water)



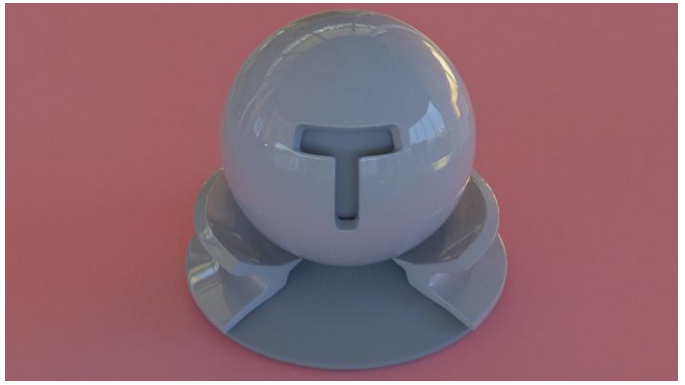
IOR = 2.45 (diamond)



Rough Conductor
(ggx, roughness 0.1)



Rough Dielectric
(ggx, roughness 0.1)



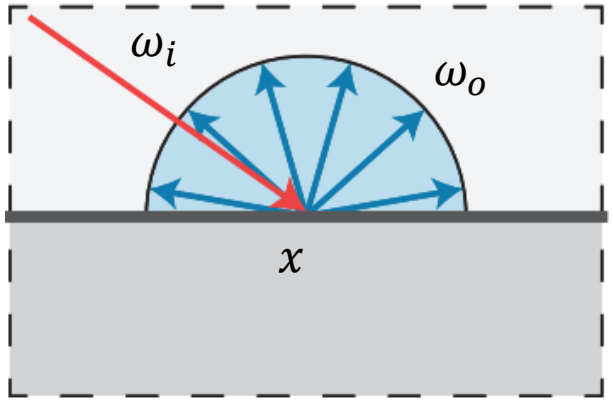
Plastic

(3 Week) Work Progress

PEARL ABYSS

- Material Implementation

```
namespace diffuse
{
    void Sample(Raypayload payload, SampledResult result);
    float3 Eval(Raypayload payload, SampledResult result, float3 wo);
    float3 Pdf(Raypayload payload, SampledResult result, float3 wo);
}
```

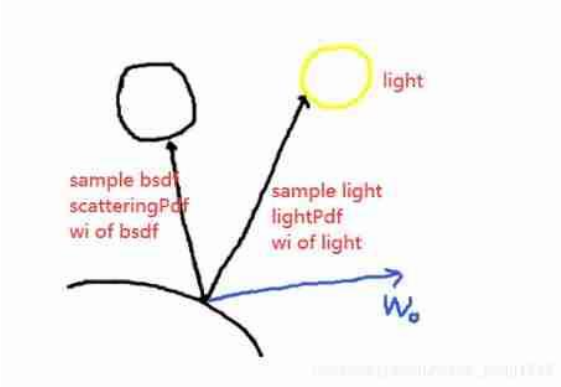


Sample : return sampled direction ω_o, weight and pdf given ω_i, x

Eval : return BSDF $f_r(x, \omega_i, \omega_o)$

Info in payload

Pdf : return PDF proportional to $f_r(x, \omega_i, \omega_o)(n \cdot \omega_o)$



Sample is used for BSDF sampling

Eval, Pdf is used for light sampling

(3 Week) Work Progress

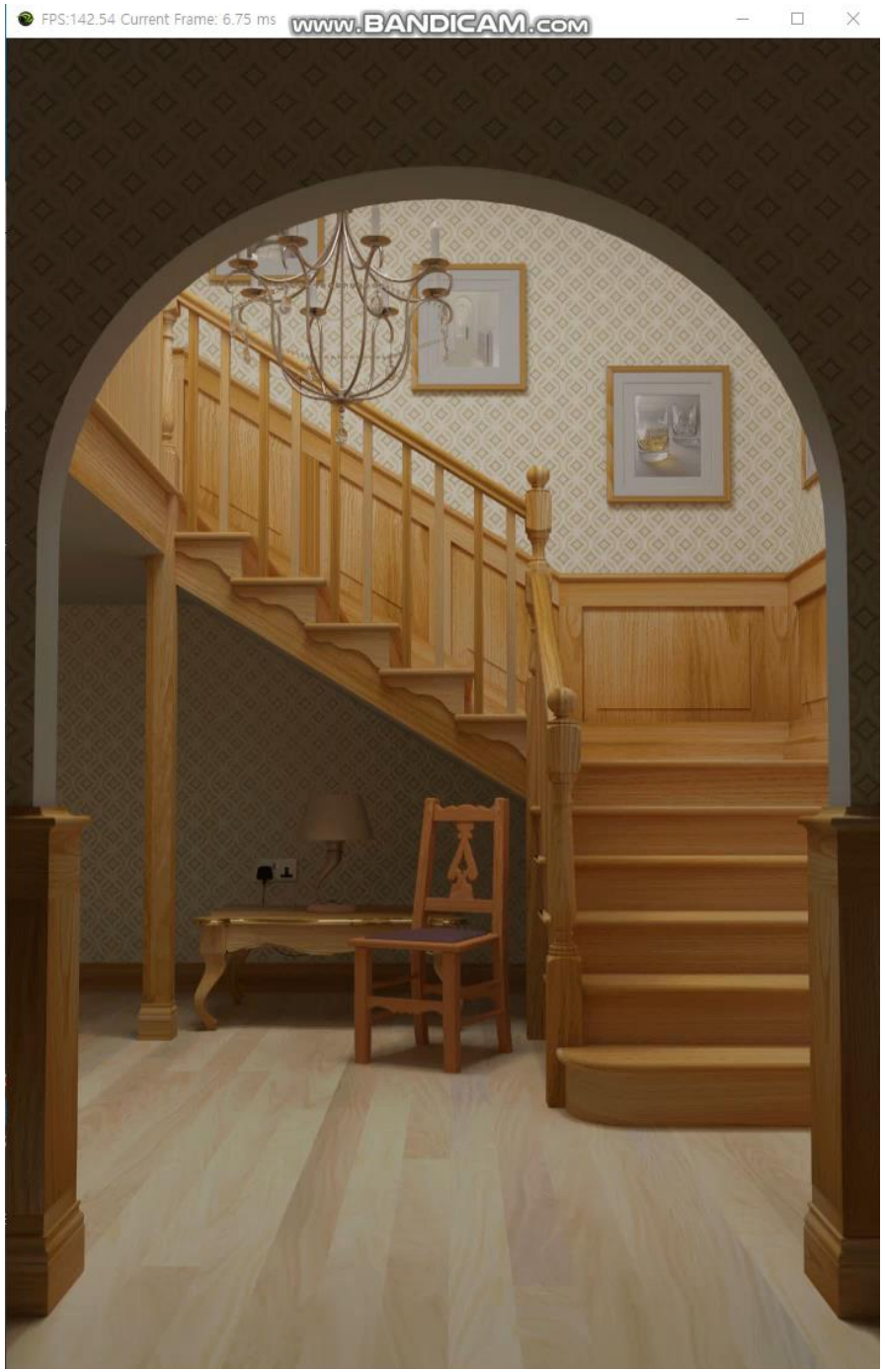
PEARL ABYSS

- Reduce recursion depth by moving shadow ray program from closest hit to ray gen program

```
[raygen]
void GenerateRay
{
   TraceRay(ray, …)
}

[closest hit]
void Closesthit
{
   (1) BSDF Sample
   (2) Light Sample + Trace shadow ray
   TraceRay(shadow ray, …)
}
```

```
[raygen]
void GenerateRay
{
   TraceRay(ray, …)

   (1) BSDF Sample
   (2) Light Sample + Trace shadow ray
   TraceRay(shadow ray, …)
}

[closest hit]
void Closesthit
{
   just put ray information into payload
}
```

1364 ms → 953 ms (x1.5)


FPS:142.54 Current Frame: 6.75 ms
www.BANDICAM.com


FPS:83.93 Current Frame: 11.79 ms
www.BANDICAM.com
Love

TODO

PEARL ABYSS

- Improving path tracing performance
- (1) Denoising / Filtering / Post processing → SVGF, A-SVGF
- (2) Improving sampling quality → ReSTIR GI, Path Guiding papers
- Currently working on SVGF, A-SVGF