

Real-Time Global Illumination in Point Clouds

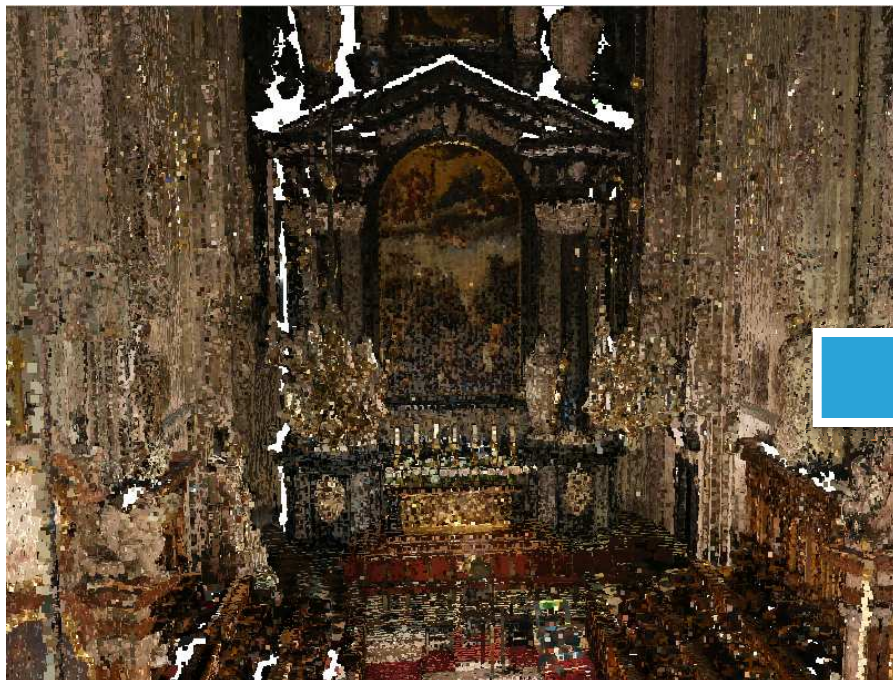
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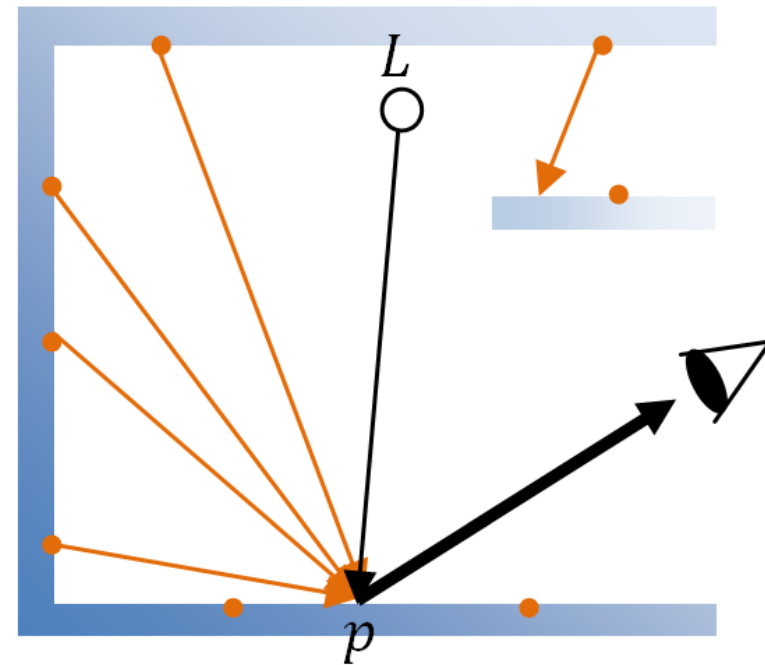
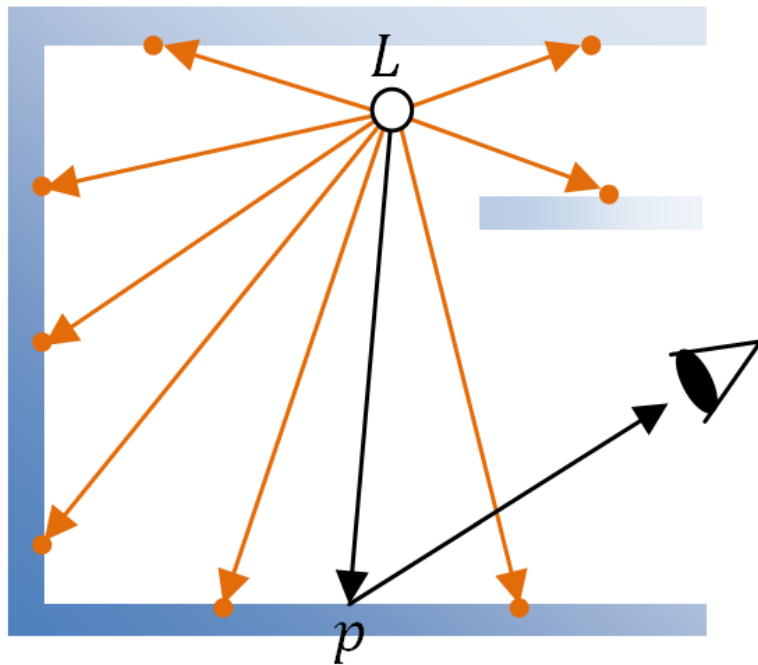
Vienna University of Technology



- Given: Huge point cloud scenes
- Target: Realistic Illumination
- Problems: Data quality, splat artifacts, etc.
- → Global Illumination (GI) applied to point clouds for the first time



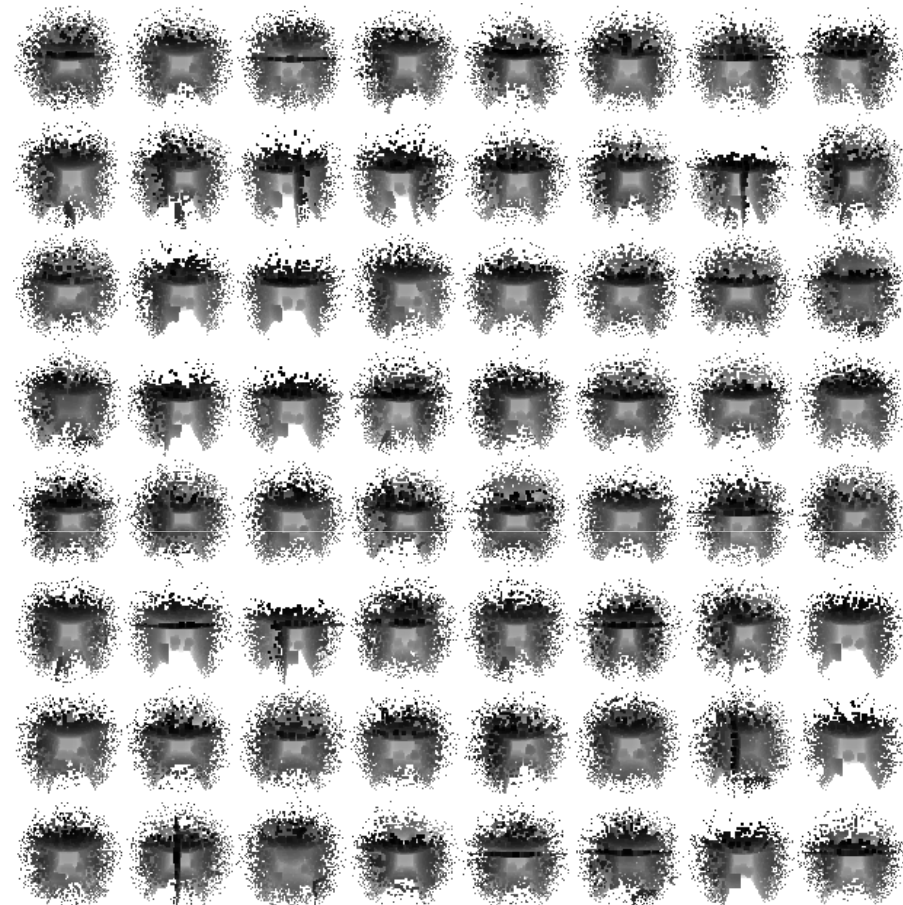
- Distributed in the scene to approximate radiance [Keller]



- Used for indirect illumination of the scene



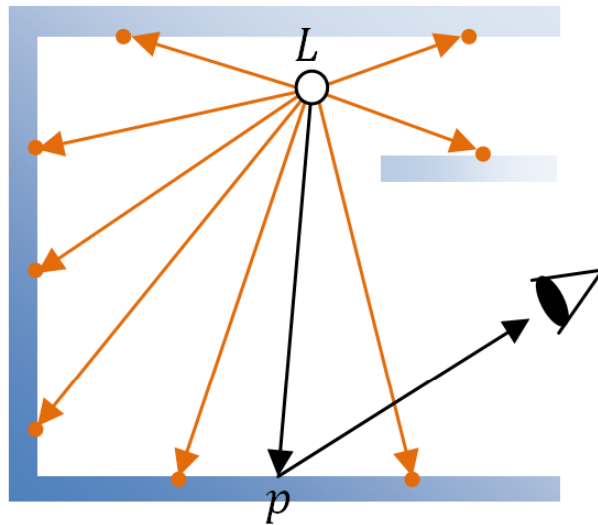
- Responsible for VPL visibility [Ritschel et al.]
- Parabolic depth map created by point splatting



- Important for scene realism



- VPLs & ISMs: Point sampling necessary
 - ◆ VPLs: store surface positions on meshes
 - ◆ ISMs: points for splatting



- 1) Preprocessing: faster, but semi-dynamic
- 2) On the fly: dynamic, but slow performance



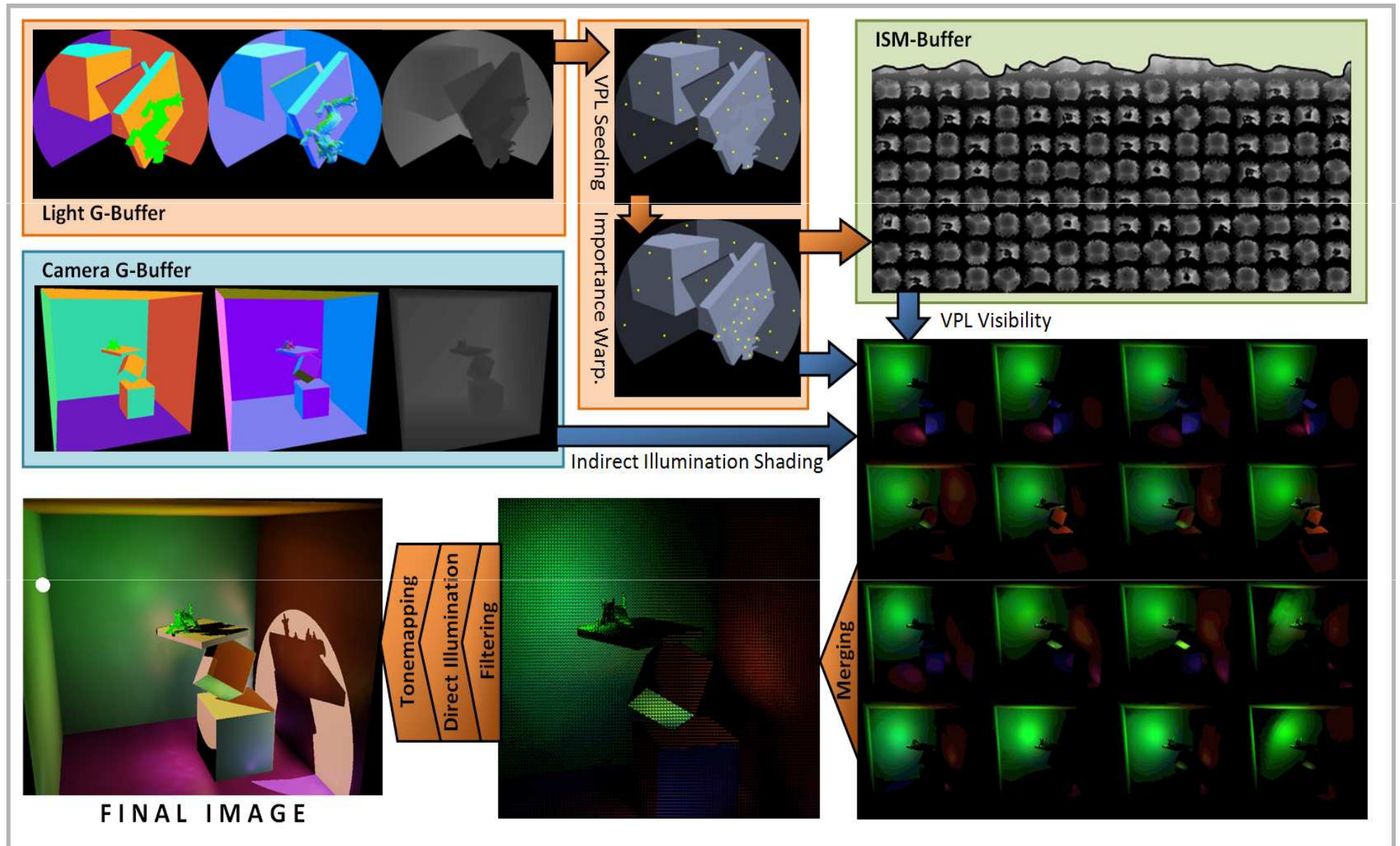
- In point clouds:

WE DON'T CARE

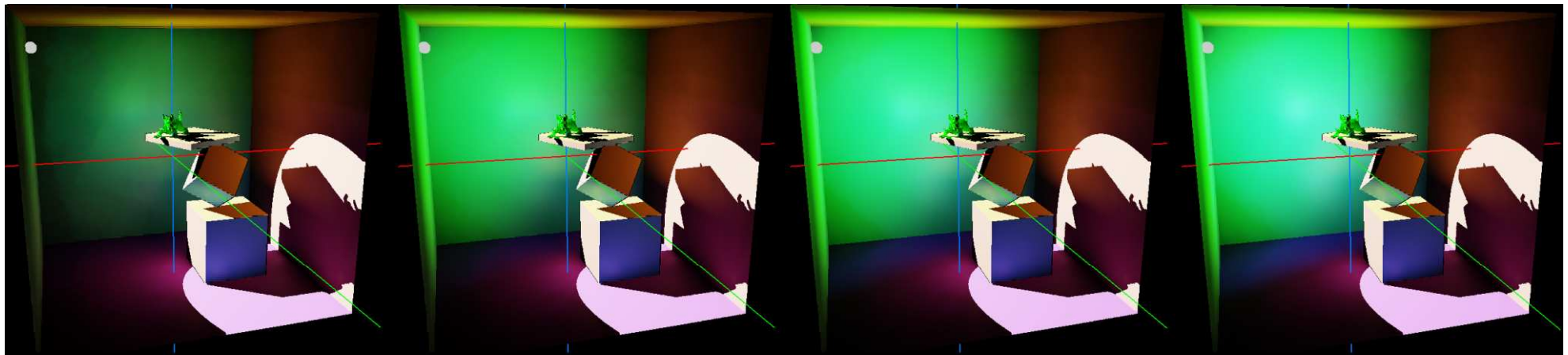
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GI Render Chain



- Increasing realism by multiple indirect diffuse and specular light bounces



1 bounce

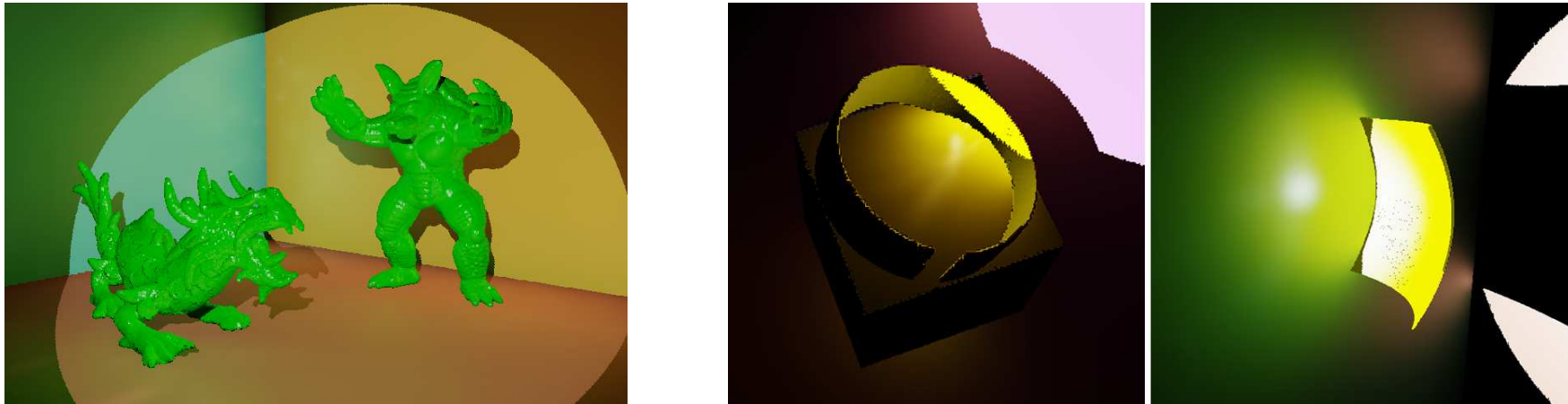
2 bounces

3 bounces

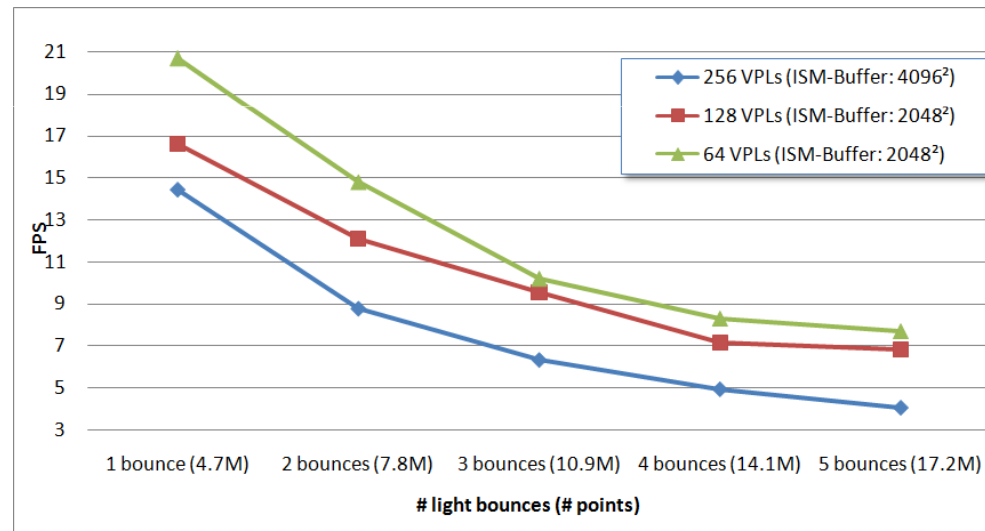
4 bounces



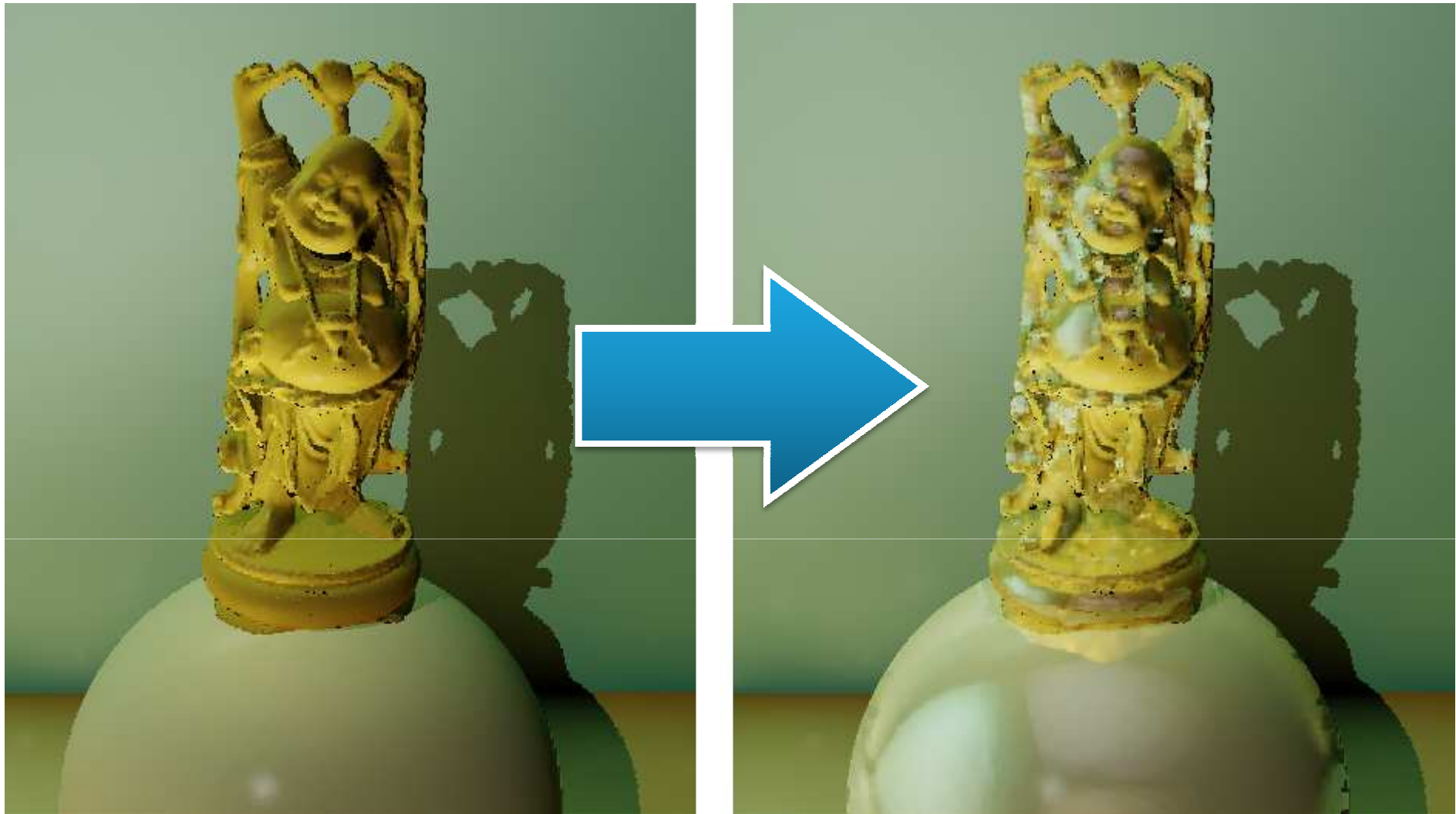
Diffuse and glossy scenes, caustics



■ Performance: Interactive up to real-time



- Screen-space curved reflections



**Thank You
Folks!**

