Ref-GS: Directional Factorization for 2D Gaussian Splatting

Youjia Zhang[1], Anpei Chen[2,3,†], Yumin Wan[1], Zikai Song[1], Junqing Yu[1], Yawei Luo[4], Wei Yang[1,†]

Contact: youjiazhang@hust.edu.cn

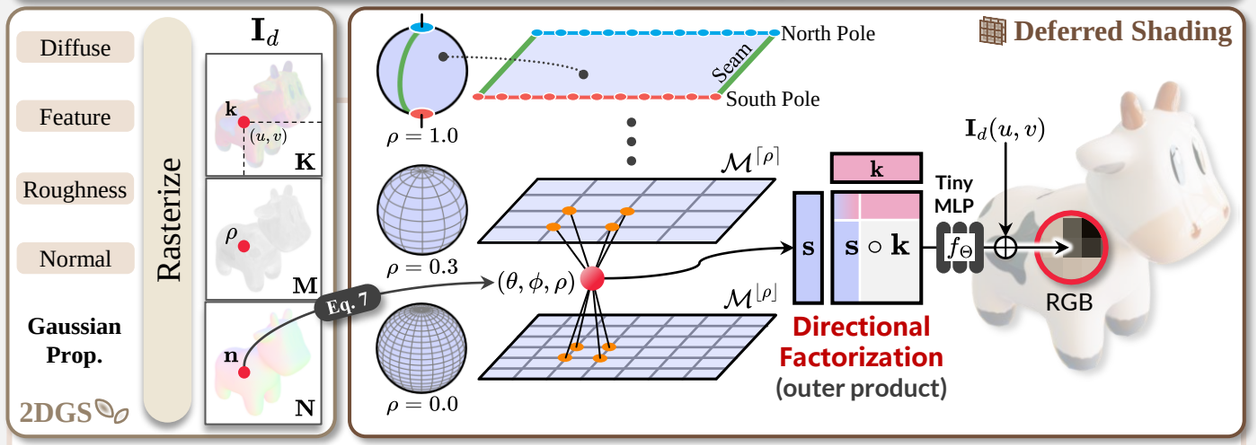
CVPR Nashville JUNE 11-15, 2025

Why do we need Ref-GS ?

GS in favor of **Faking Reflection** Using Inner noise.

We achieve view-dependent **Realism** and accurate **Geometry** via Geometry-Lighting factorization.

Method: Geometry & Appearance



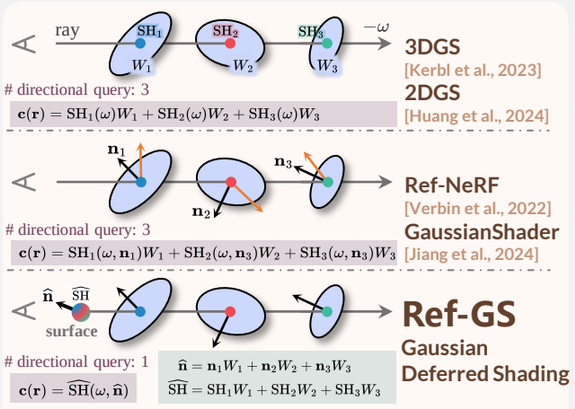
3D Modeling | Sph-Mip Encoding | Rendering

Far-field Lighting:

We query a pre-filtered **Mipmap** according to surface roughness to encode distant reflections.

Near-field Lighting:

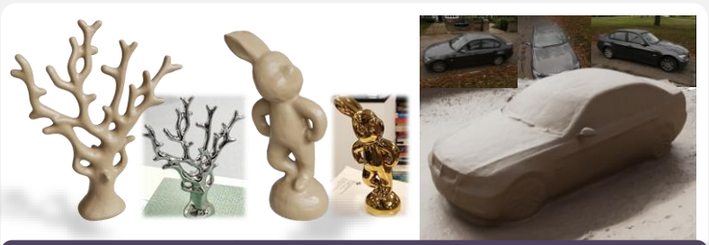
We propose a **low-rank Tensor Factorization** to represent spatio-angular view-dependent effects.



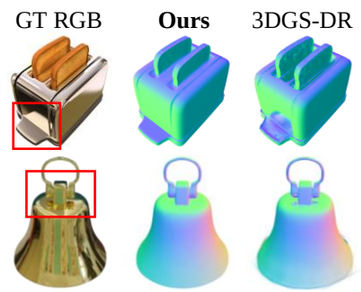
Ambiguity in Directional Query

Project Page

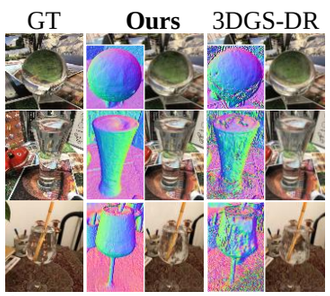
Code



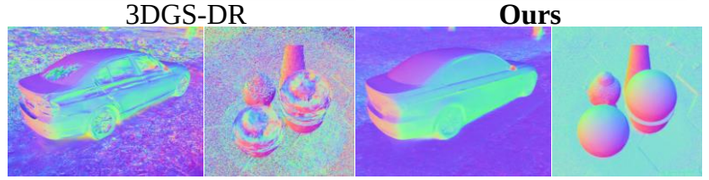
Geometry Results

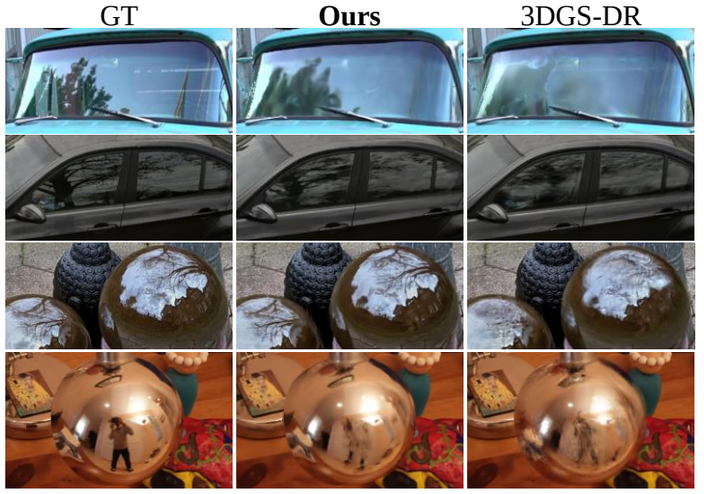


Inter-Reflections



Refractions





Real Captures