



GRAF:

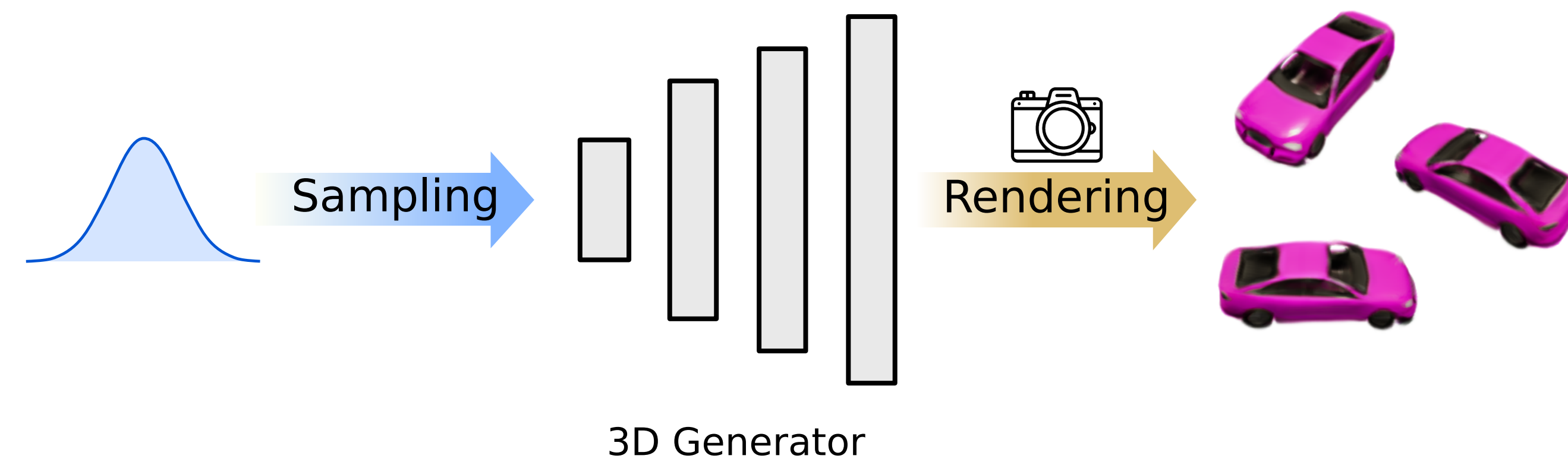
Generative Radiance Fields for 3D-Aware Image Synthesis

Katja Schwarz Yiyi Liao Michael Niemeyer Andreas Geiger
MPI for Intelligent Systems and University of Tübingen



Motivation

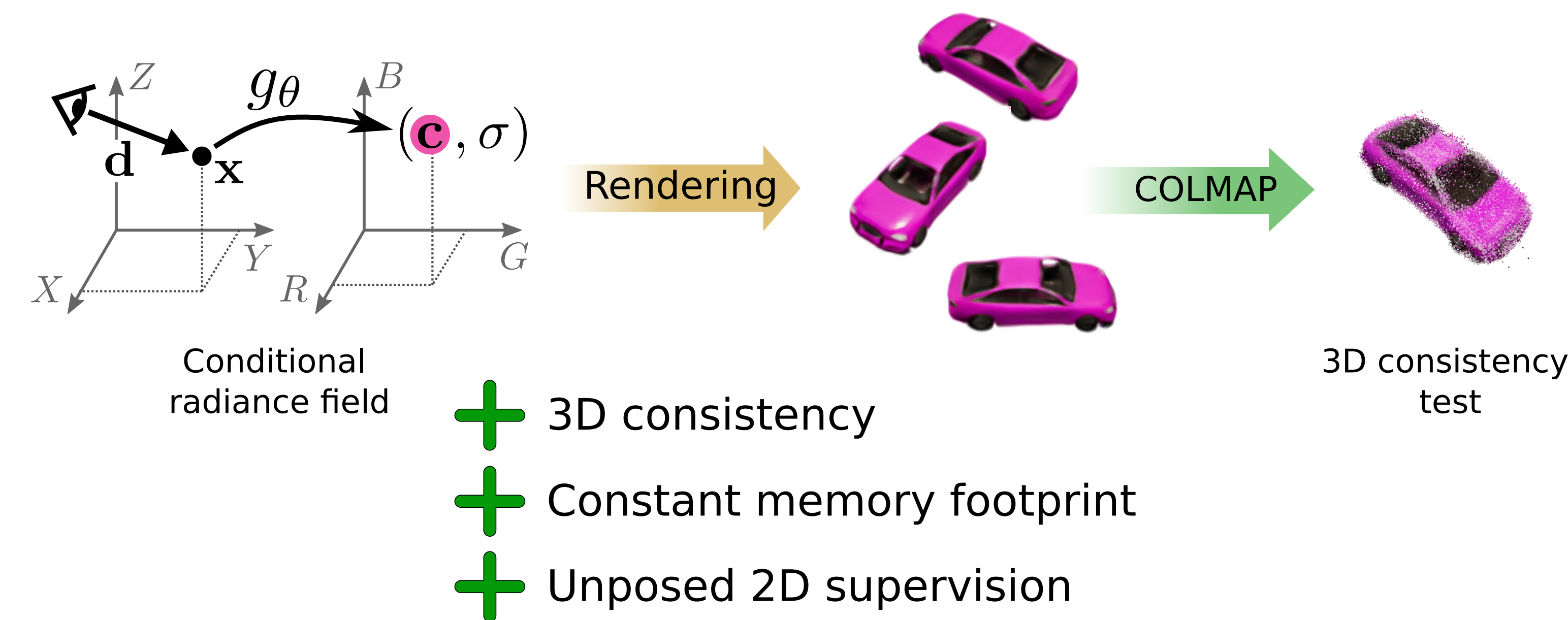
- **2D GANs** achieve impressive image synthesis
- But we need **3D-awareness** to model 3D properties like viewpoint changes explicitly



- Can we learn a 3D-aware generative model **from unposed 2D images** only?

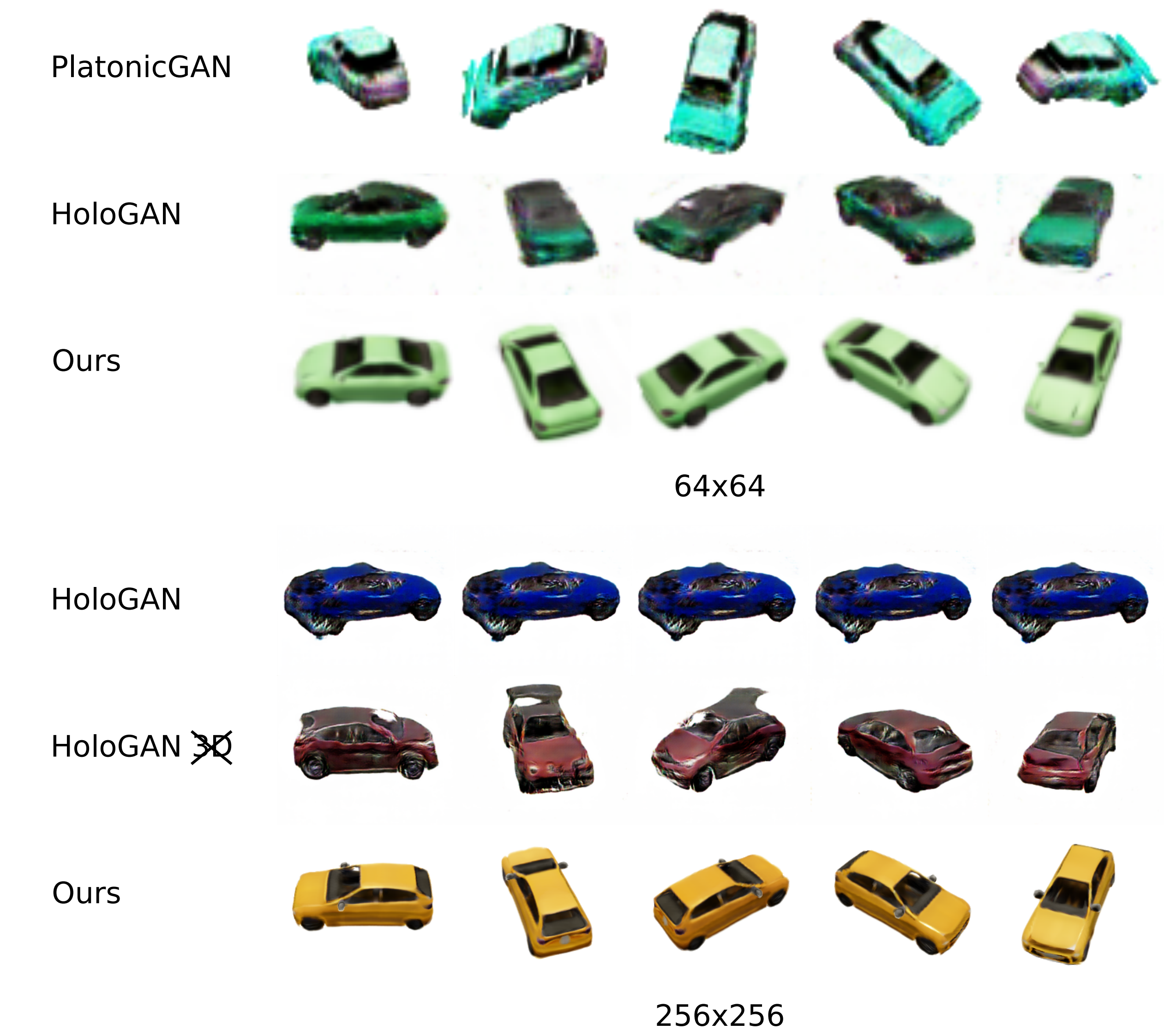
Our Representation

Idea: Generate full 3D object using a **continuous representation** $g_\theta : \mathbb{R}^5 \times \mathbb{R}^{M_s} \times \mathbb{R}^{M_a} \rightarrow \mathbb{R}^3 \times \mathbb{R}^+$

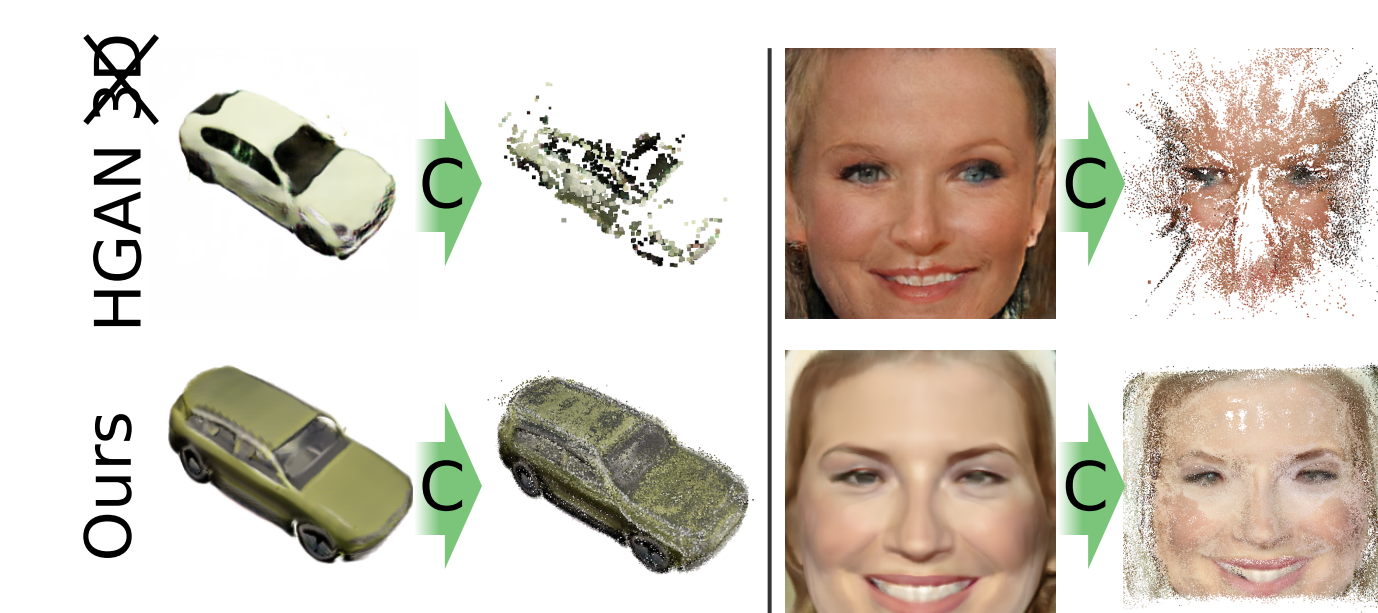


Experiments

Viewpoint Interpolations



3D Consistency Test



Quantitative Results

	Chairs	Birds	Cars	Cats	Faces
2D GAN	59	24	66	18	15
PLATONICGAN	199	179	169	318	321
HoloGAN	59	78	134	27	25
Ours	34	47	30	26	25

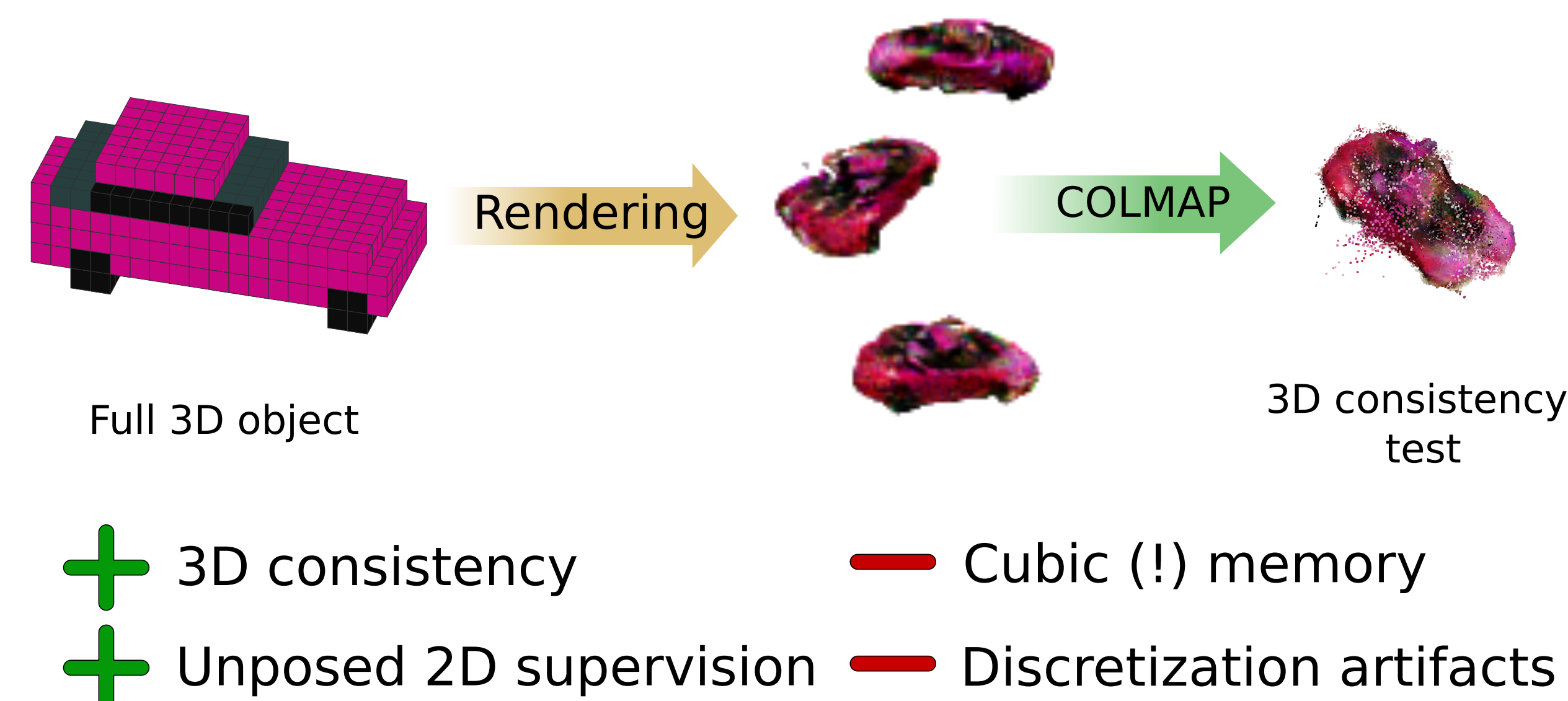
FID at image resolution 64x64 px

Disentangling Shape and Appearance

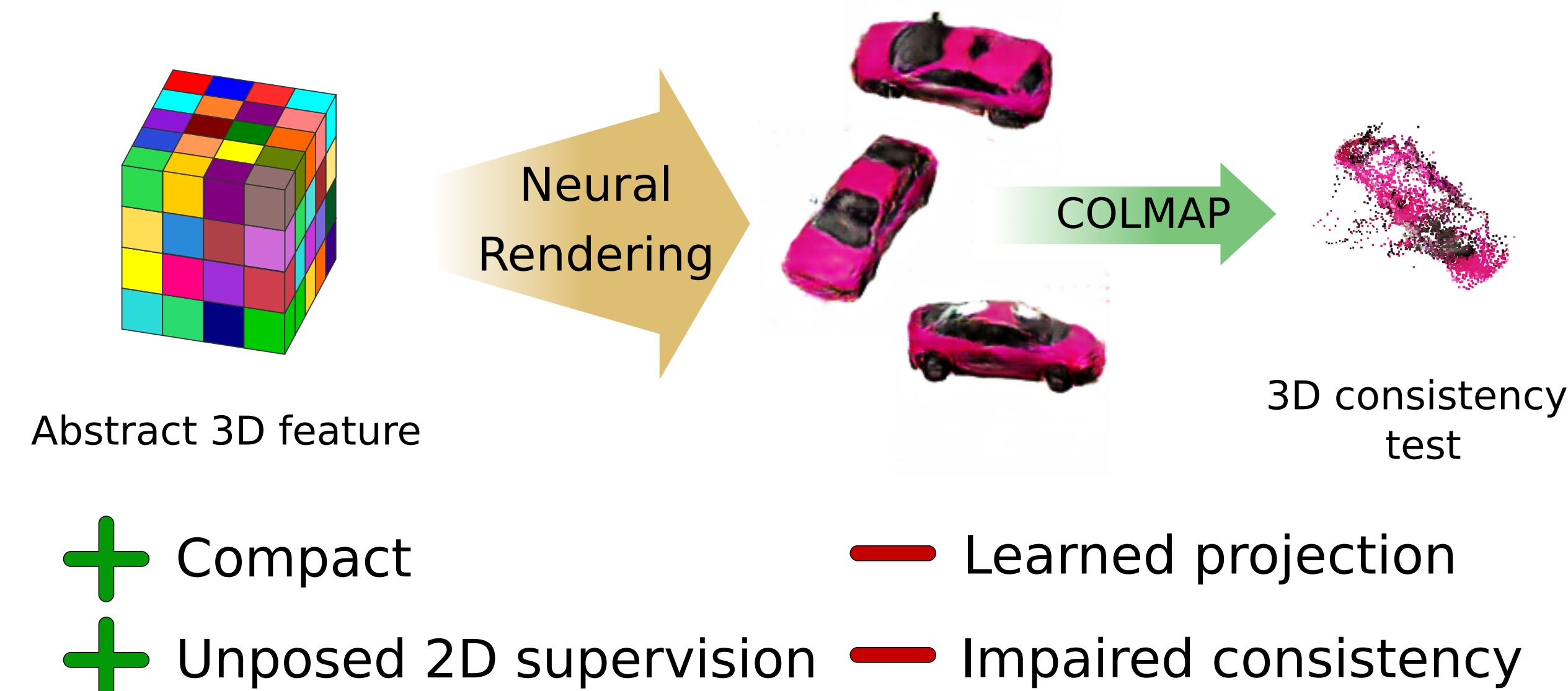


Existing 3D-aware GANs

PlatonicGAN [Henzler et al. 2019]



HoloGAN [Nguyen-Phuoc et al. 2019]



Architecture

