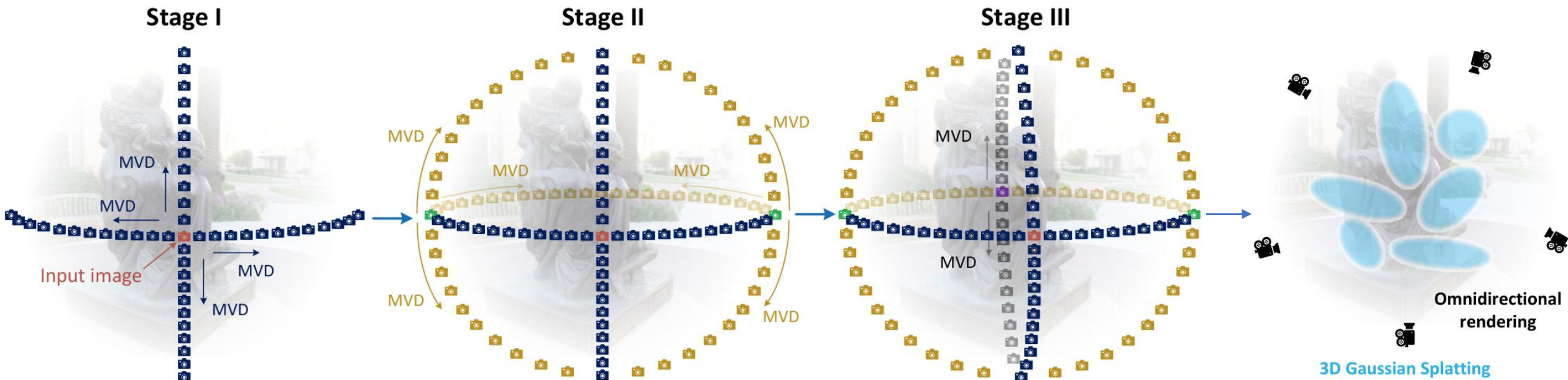# Omnidirectional 3D Scene Reconstruction from Single Image

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Omni3D: Omnidirectional 3D Scene Reconstruction from a Single Image
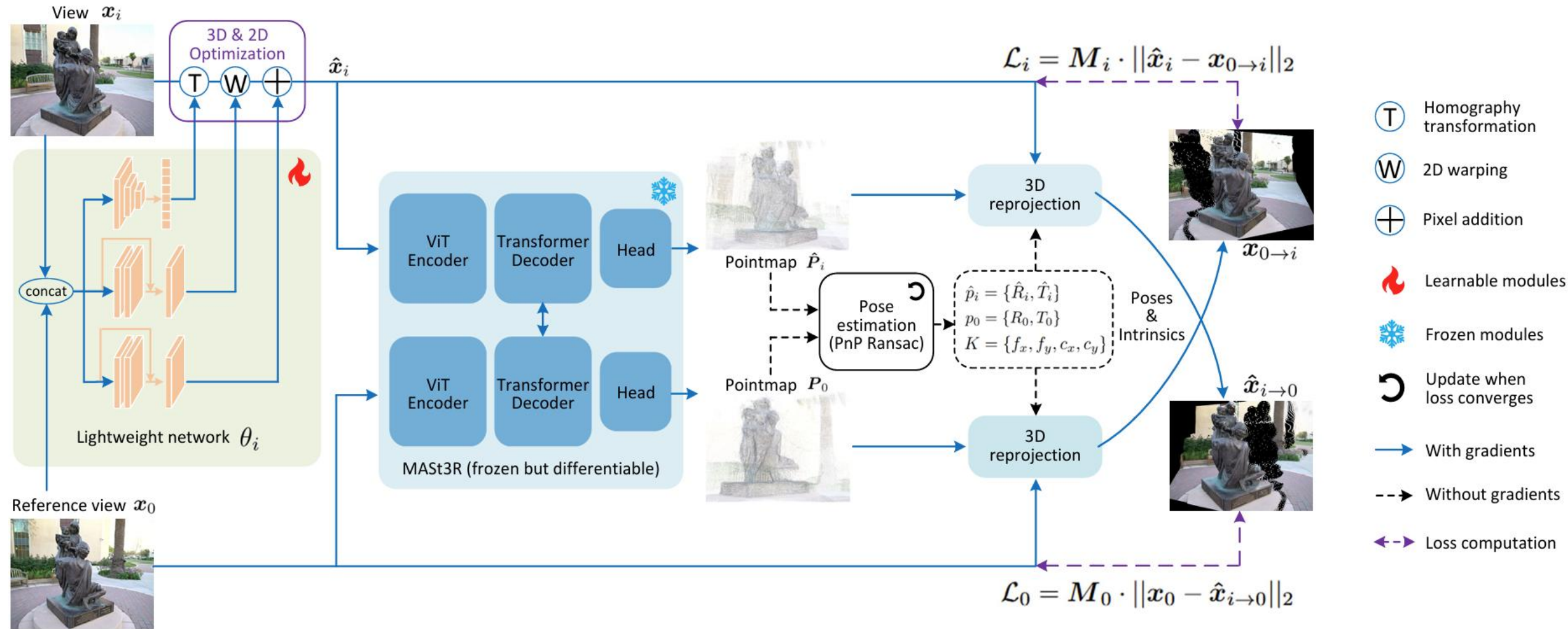
Overall framework

MVD: Multi-View Diffusion

Challenge: Content distortions and geometric inconsistencies in generated novel views challenge the accurate 3D reconstruction.

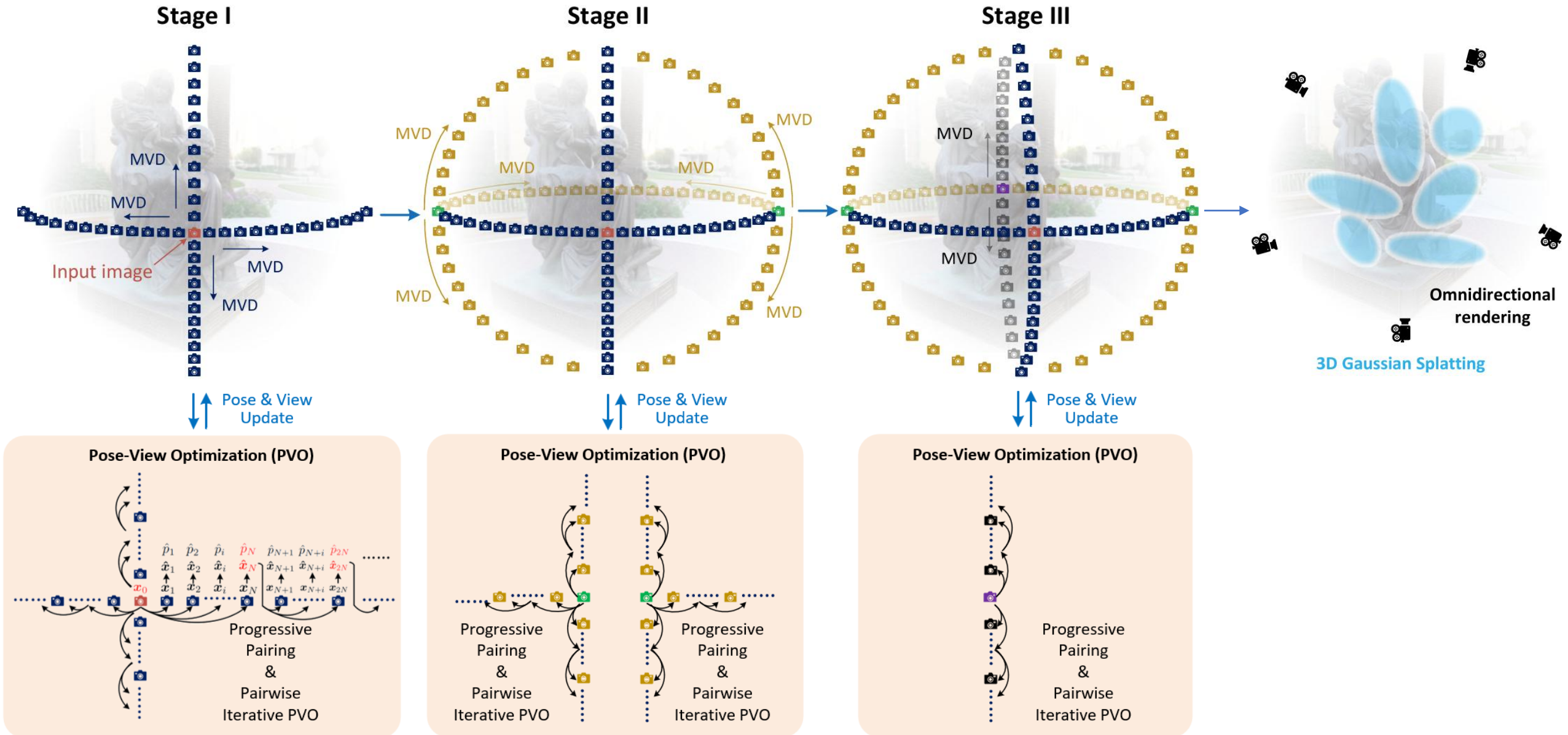# Omni3D: Omnidirectional 3D Scene Reconstruction from a Single Image

The proposed Pose-View Optimization (PVO) method

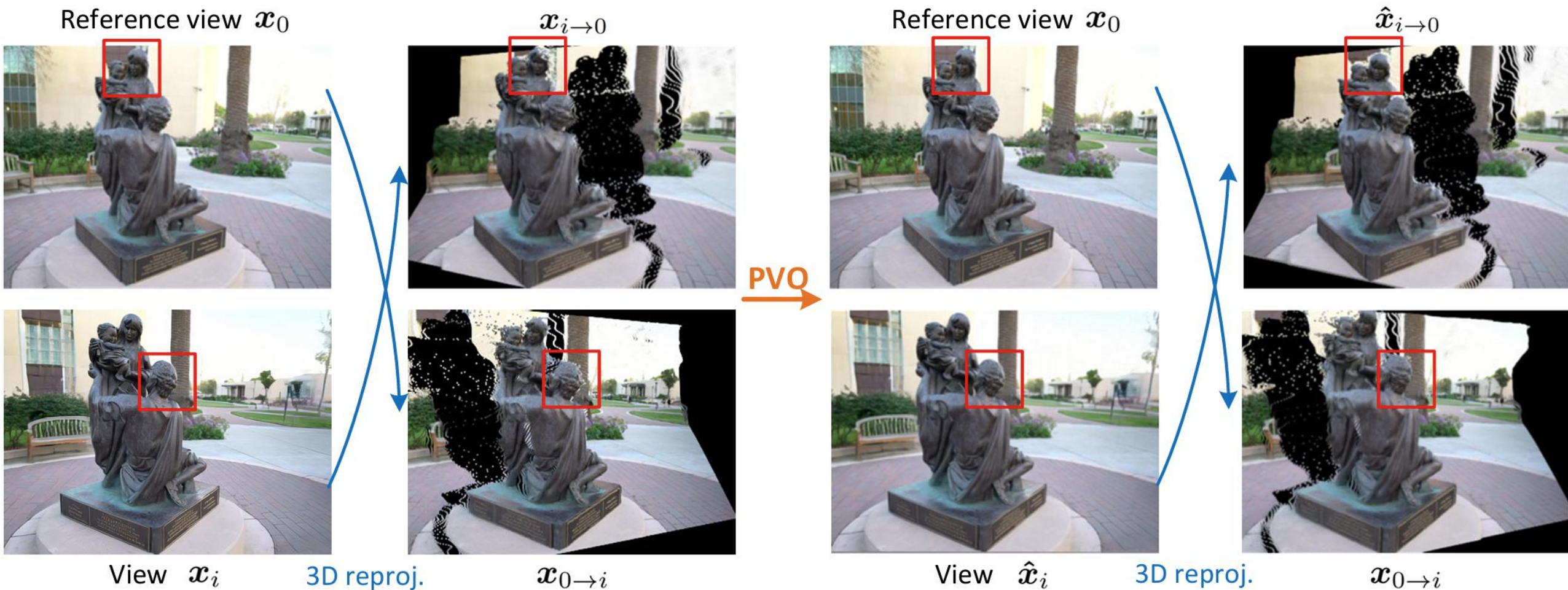The lightweight network and estimated poses are **iteratively** optimized until convergence

Omni3D: Omnidirectional 3D Scene Reconstruction from a Single Image

Progressive pairing and PVO

# Omni3D: Omnidirectional 3D Scene Reconstruction from a Single Image

## The proposed Pose-View Optimization (PVO) method

Omni3D: Omnidirectional 3D Scene Reconstruction from a Single Image

Table 1: Evaluation of rendered views in omnidirectional space.

Methods	Tanks and Temples			Mip-NeRF 360			DL3DV		
	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓	PSNR ↑	SSIM ↑	LPIPS ↓
ZeroNVS [33]	12.67	0.4647	0.7506	13.40	0.2413	0.8299	11.28	0.4725	0.7074
ViewCrafter [51]	13.91	0.4714	0.5886	14.06	0.2420	0.7649	16.61	0.6185	0.3883
LiftImage3D [3]	14.85	0.4841	0.5781	14.27	0.2491	0.6479	16.21	0.6020	0.4844
Our Omni3D	**16.30**	**0.5308**	**0.5166**	**15.89**	**0.2859**	**0.6369**	**17.08**	**0.6649**	**0.3348**
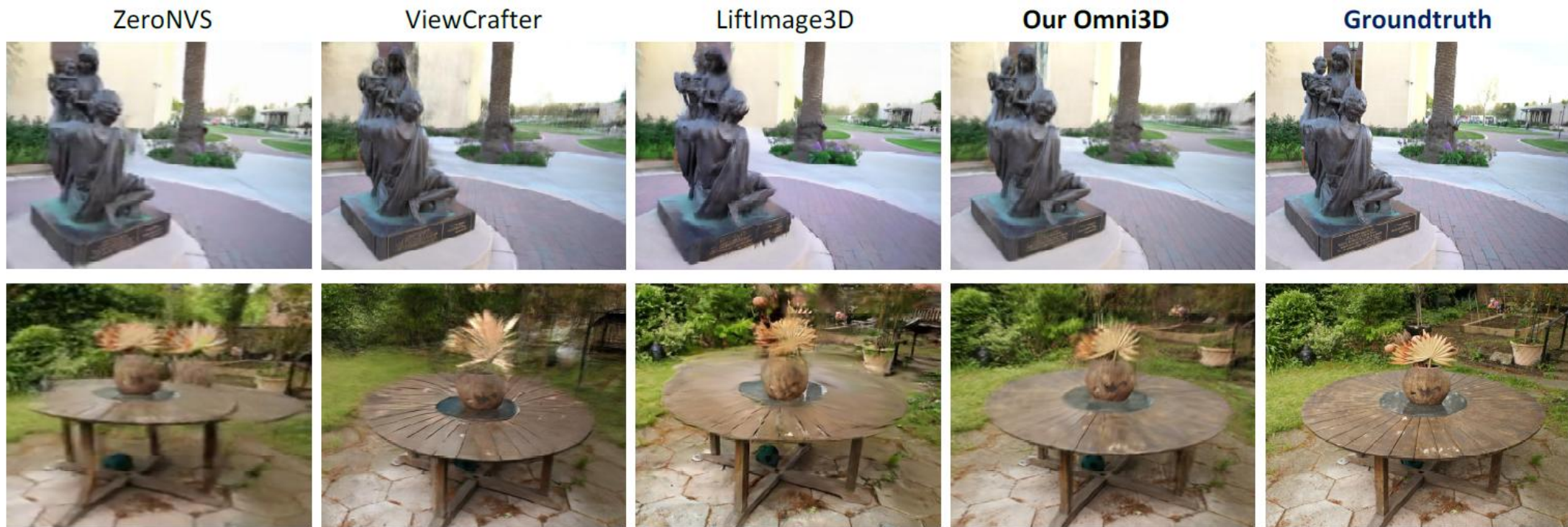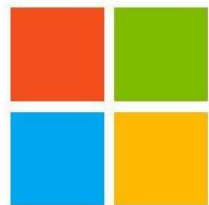
ZeroNVS	ViewCrafter	LiftImage3D	Our Omni3D	Groundtruth

Thank you for your attention

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