SparsePose: Sparse-View Camera Pose Regression and Refinement

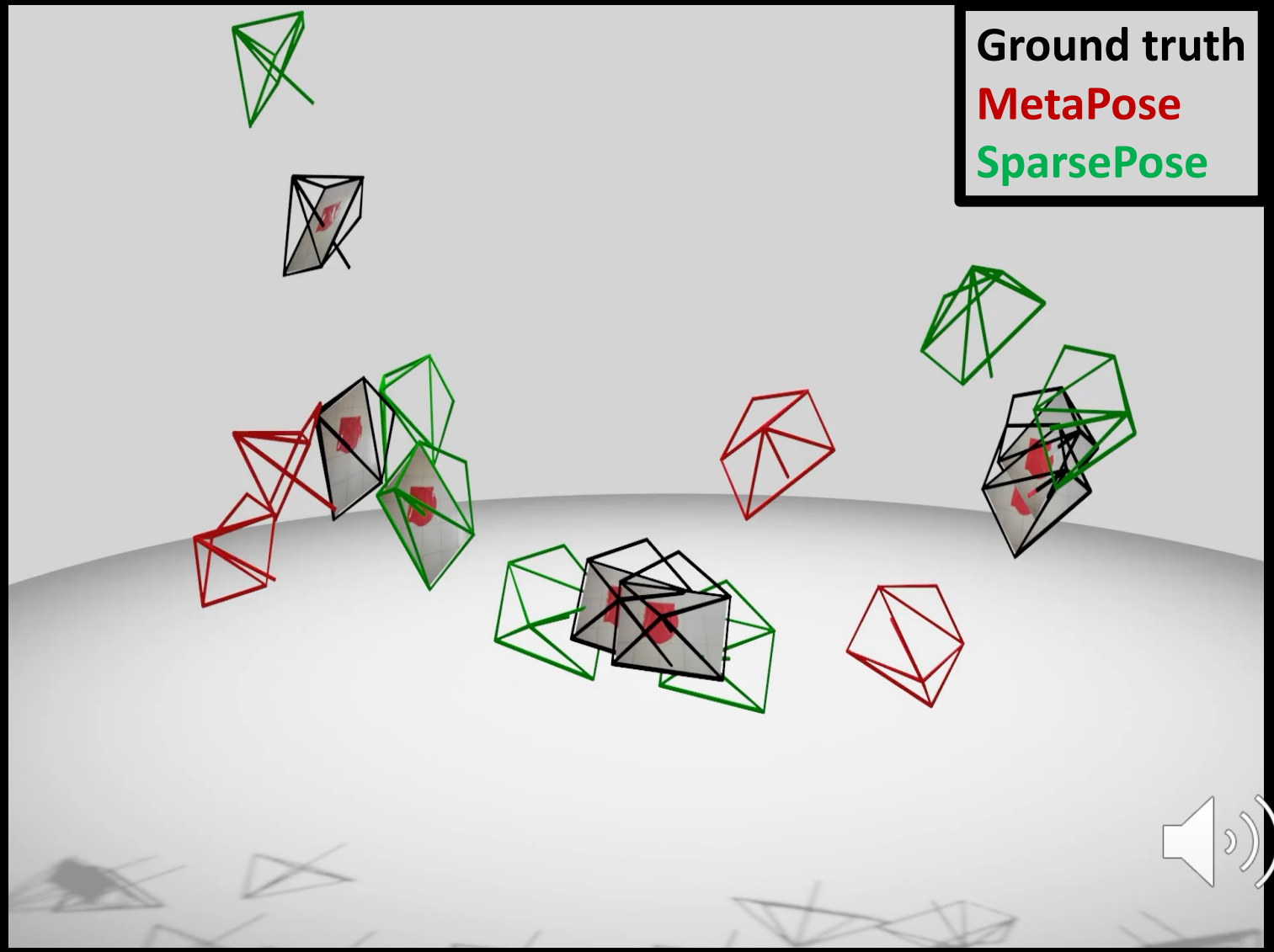
Samarth Sinha, Jason Y. Zhang, Andrea Tagliasacchi,
Igor Gilitschenski, David B. Lindell

Poster Session: Thursday-PM-071

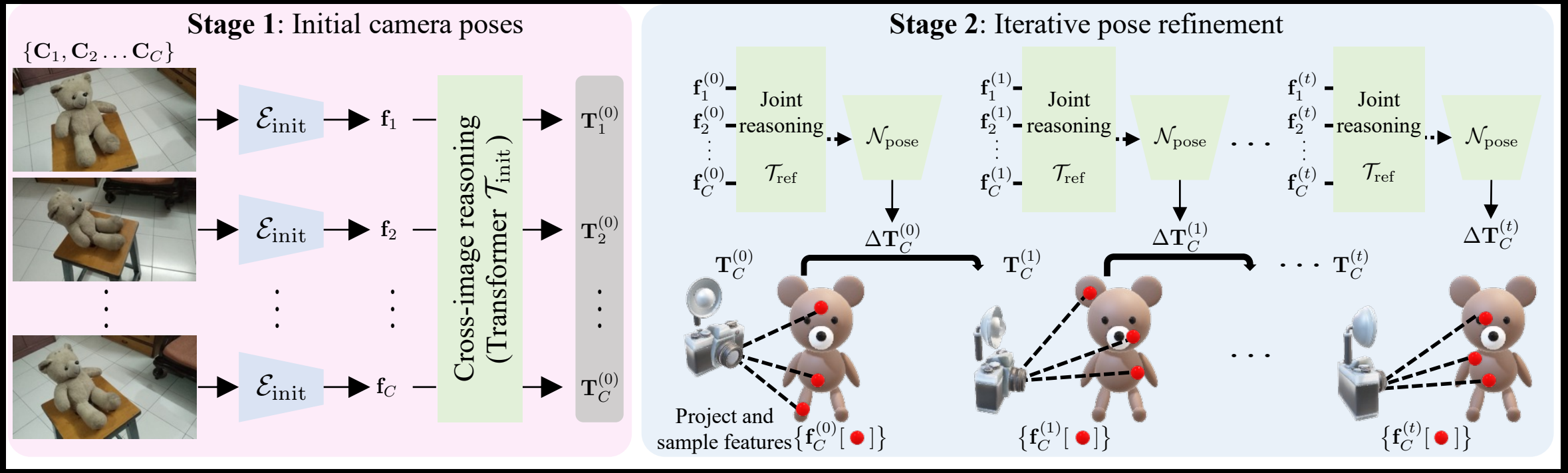
CVPR Paper ID 6021

SparsePose

Source views



SparsePose: Overview



Results: 3D Reconstruction

Source images

Source images

- 3D reconstruction using SparsePose camera poses and a pretrained NeRFormer (Reizenstein et. al, 2021)

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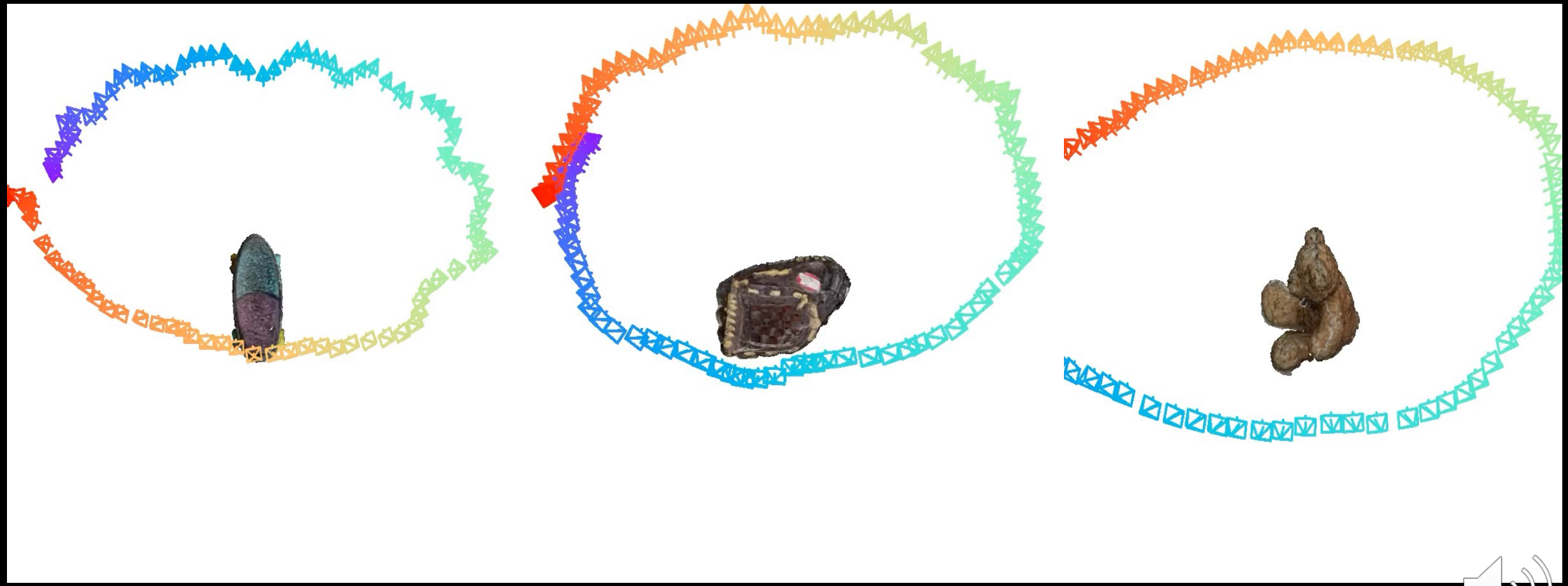
Camera pose estimation



Related Works

Structure-from-Motion
(Schonberger et al., 2016)

- Rotations and translations
- Requires dense views

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Learning-based
RelPose (Zhang et al., 2022)

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- Only rotations
- Focuses on global features

MetaPose (Usman et al., 2022)

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- Human-centric data
- Coarse initializations

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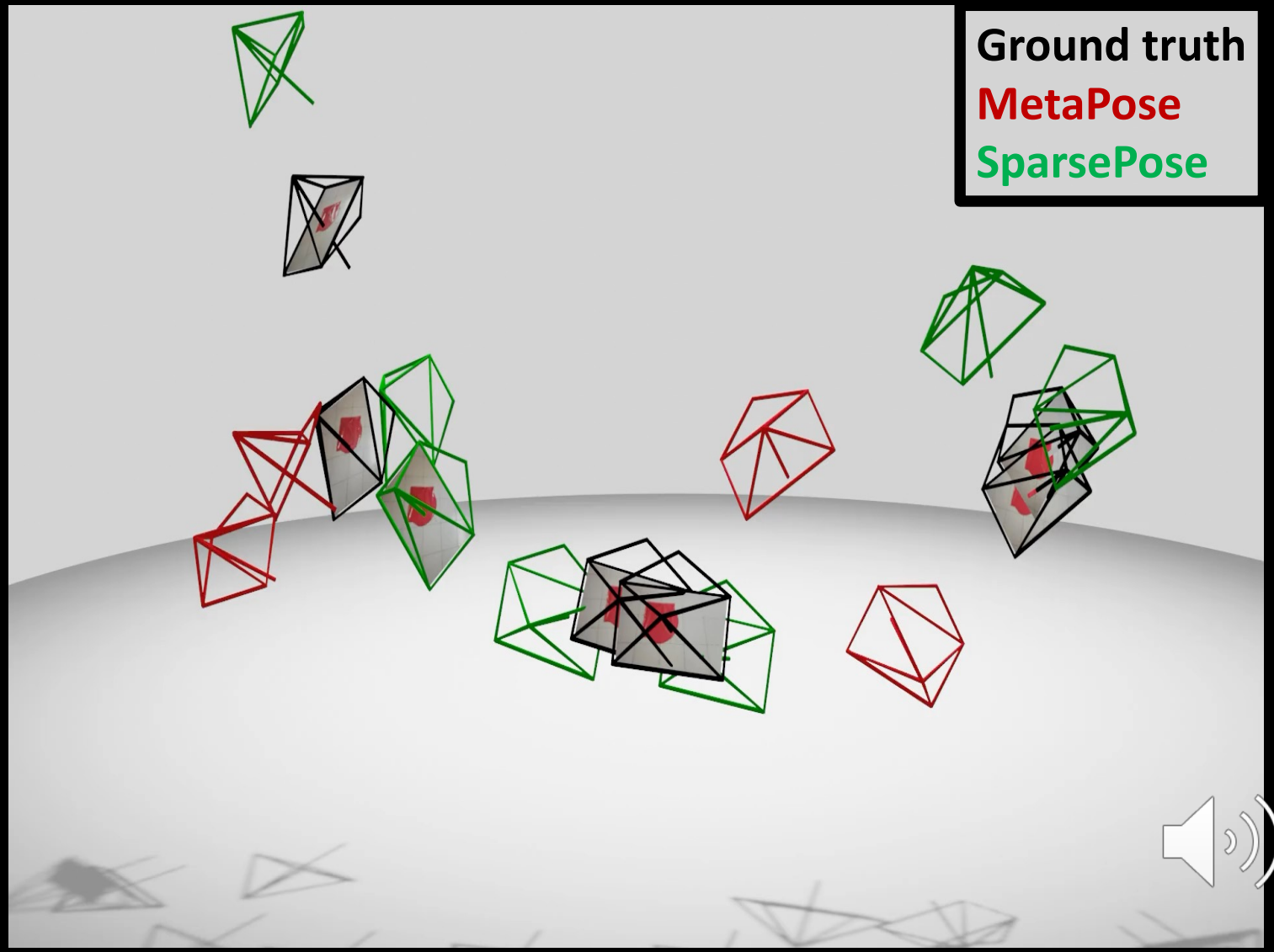
SparsePose
(Ours)

- Rotations and translations
- Works with sparse views
- Global and local features

SparsePose

Source views



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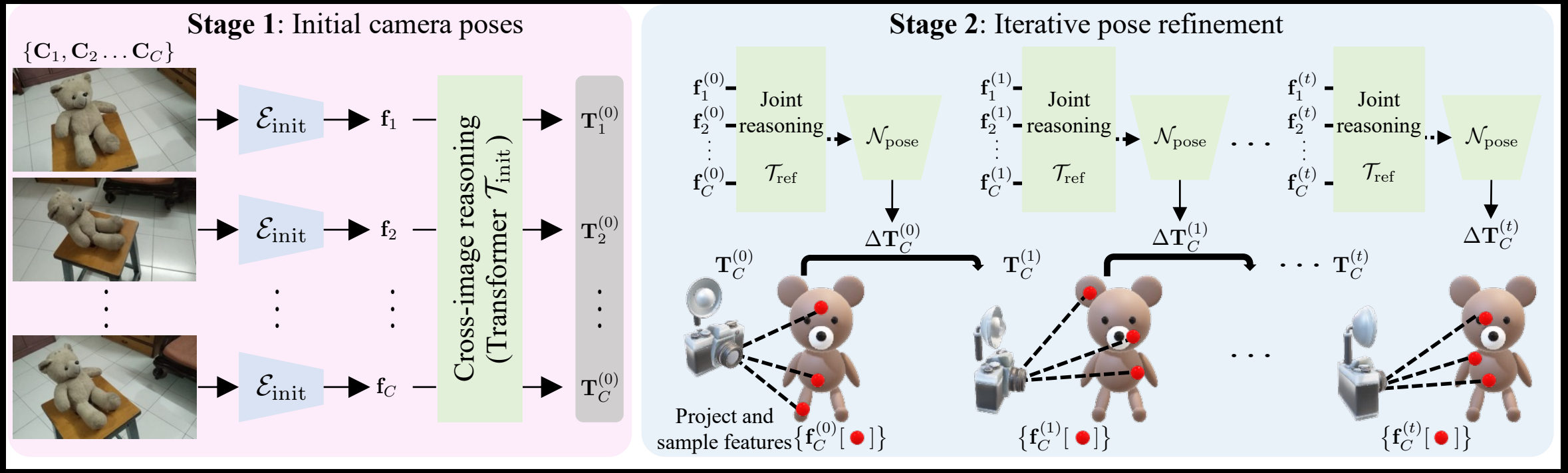
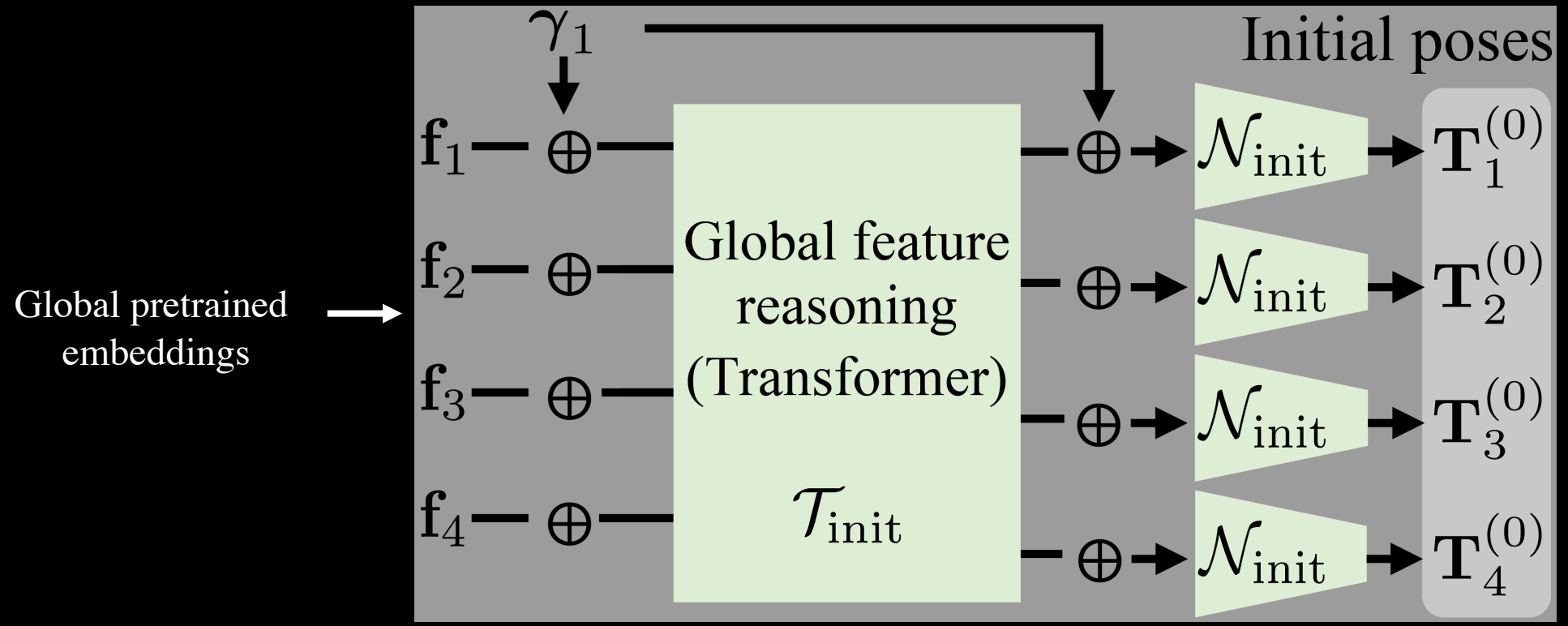
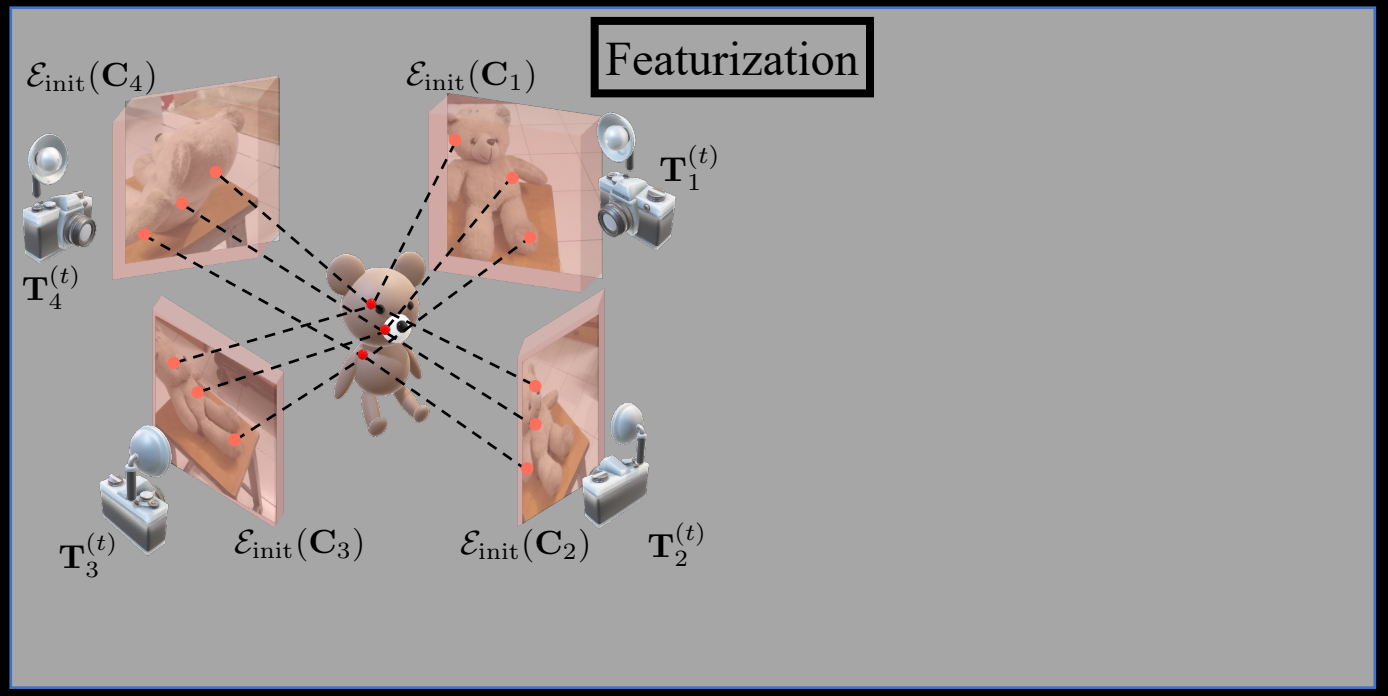


SparsePose: Pose initialization



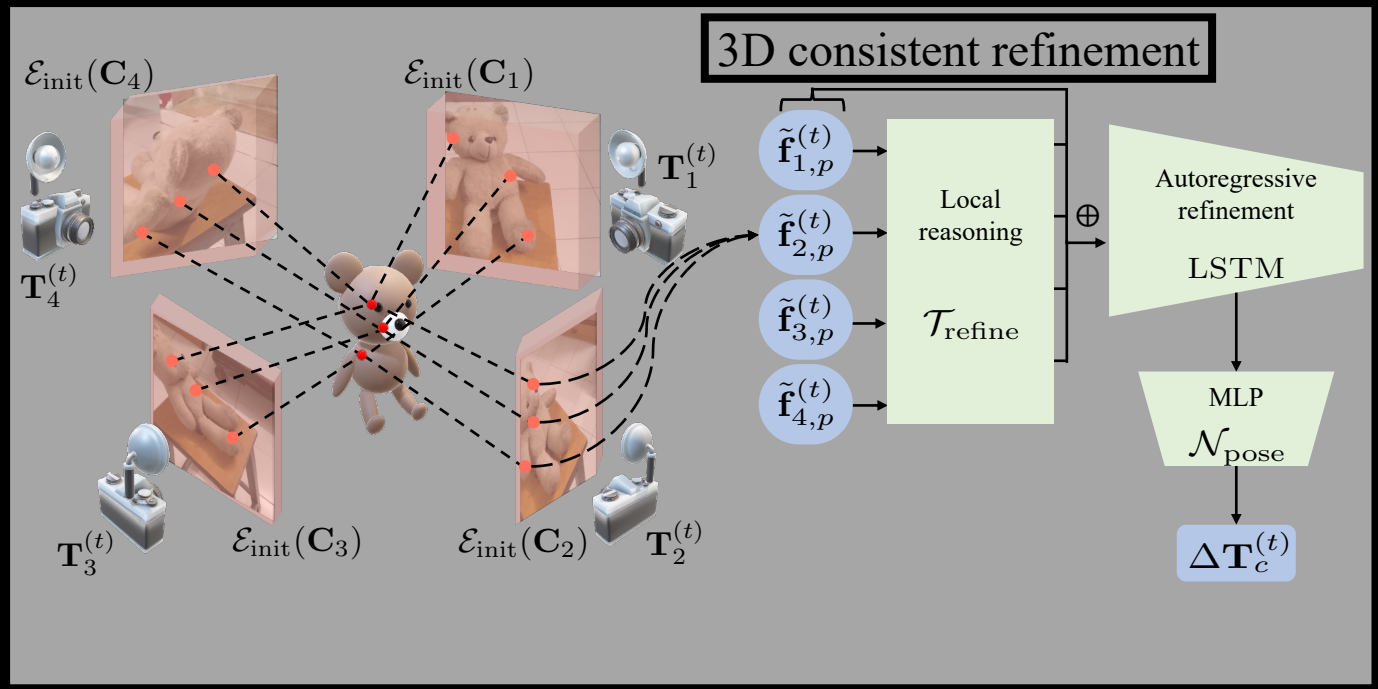
- Initialize camera poses using global image features

SparsePose: Iterative pose refinement



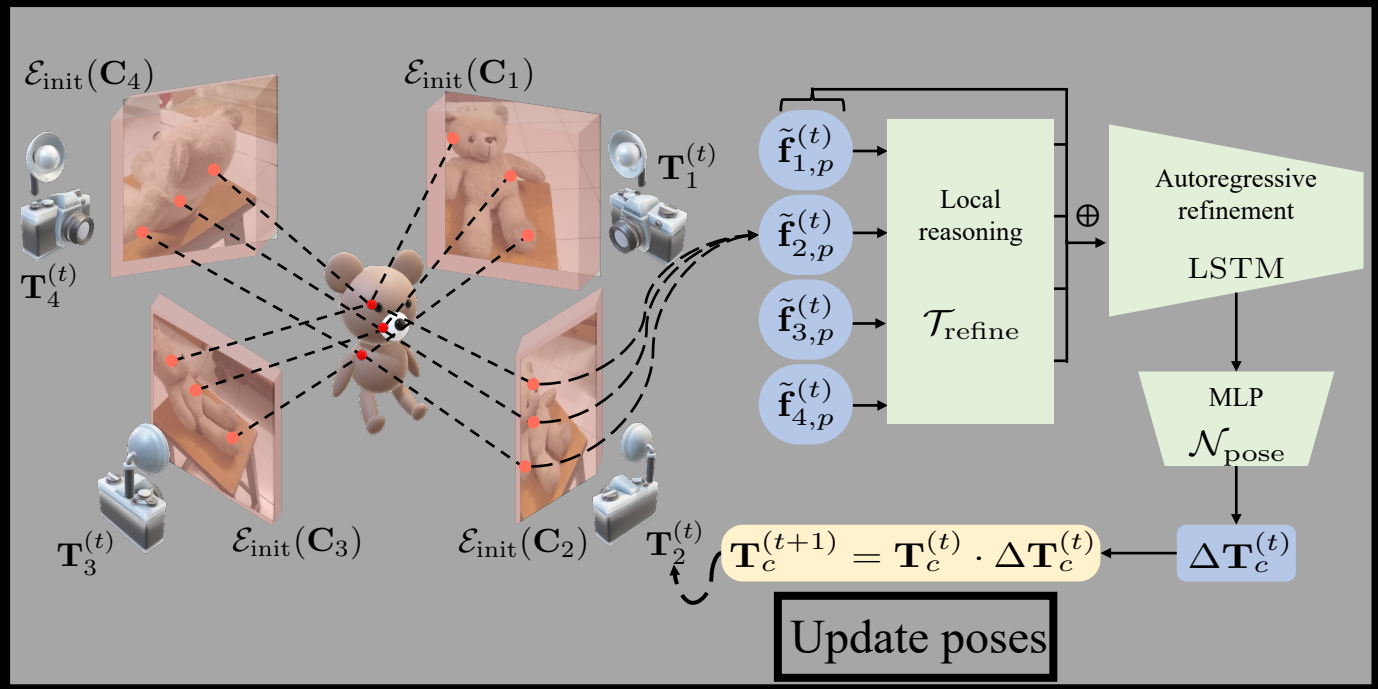
- Randomly sample 3D points and project into source views
- Sample *local* image features

SparsePose: Iterative pose refinement



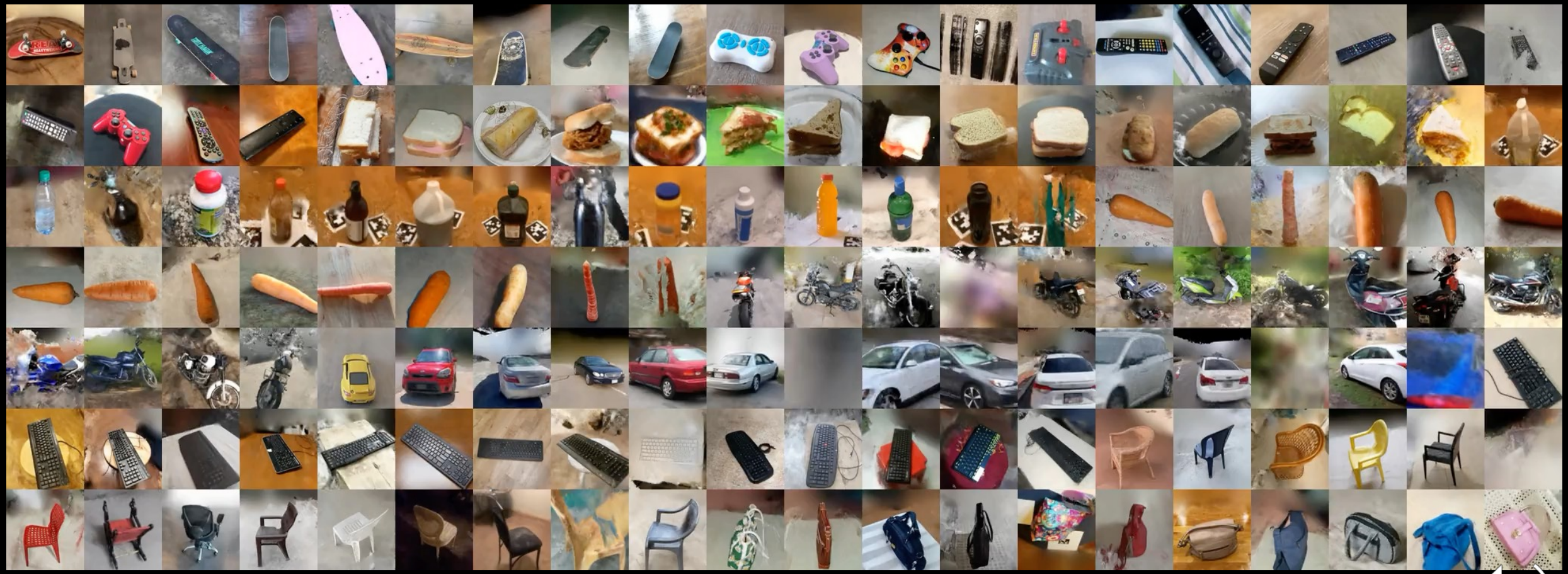
- Perform joint local reasoning and predict pose offsets

SparsePose: Iterative pose refinement



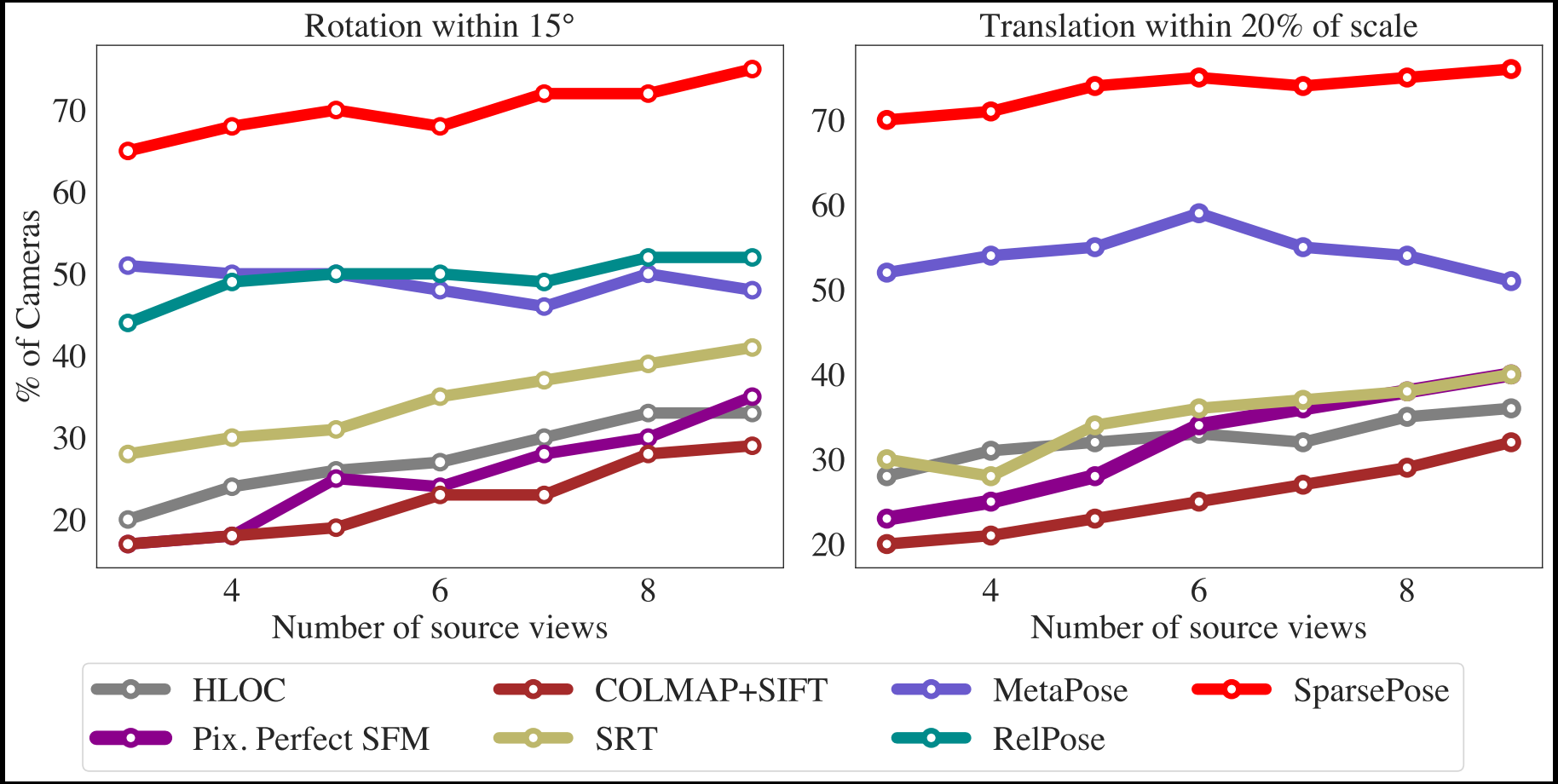
- Iteratively solve the non-linear optimization

SparsePose: Training



CO3D (Reizenstein et al., ICCV 2021)

Results: Camera pose estimation



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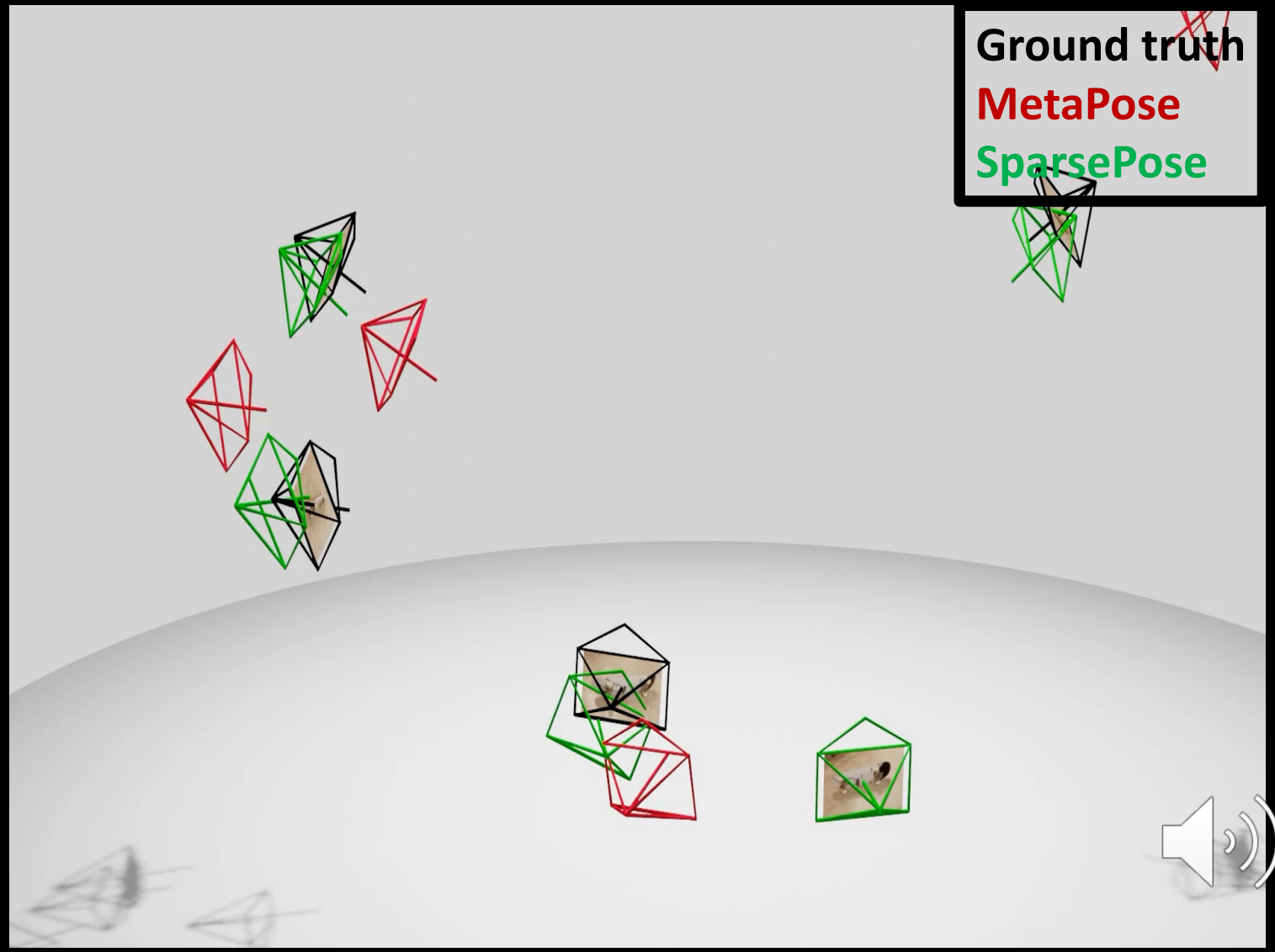
Source views



Results: Camera pose estimation

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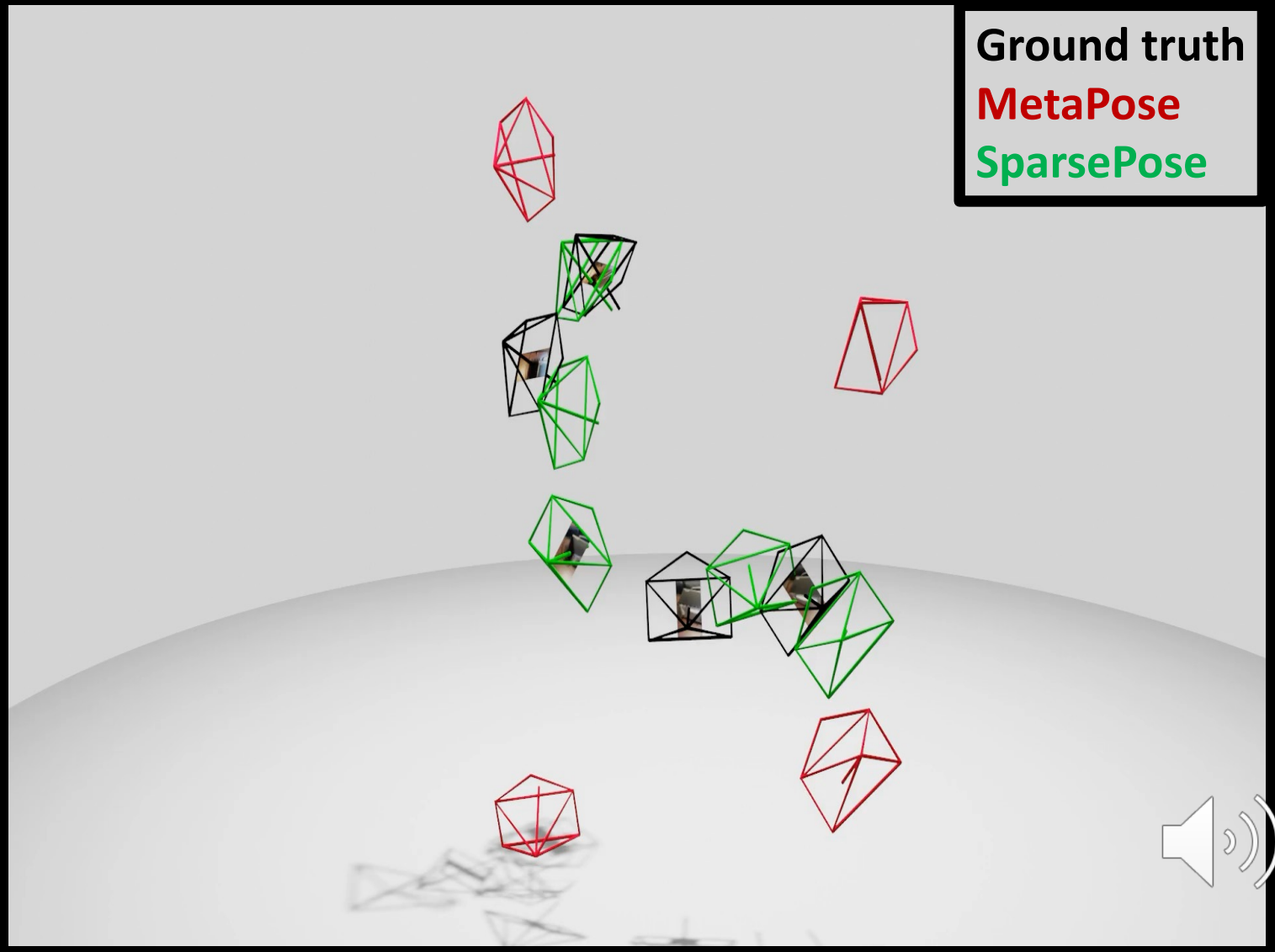
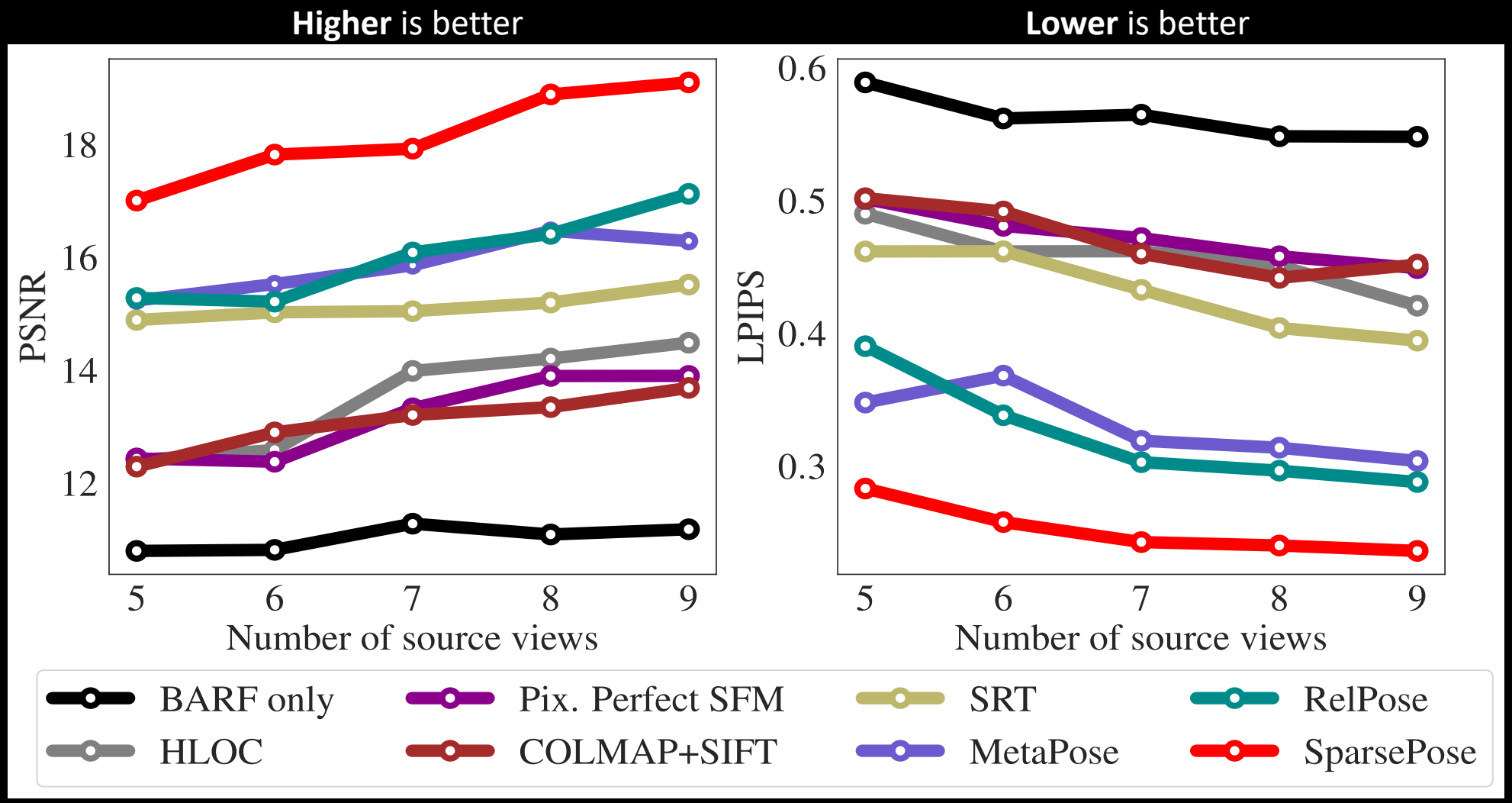


Results: 3D Reconstruction



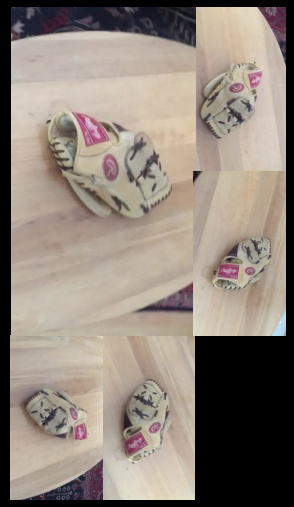
Results: 3D Reconstruction

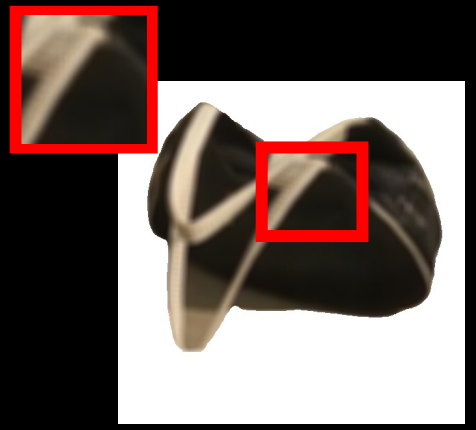
Source images

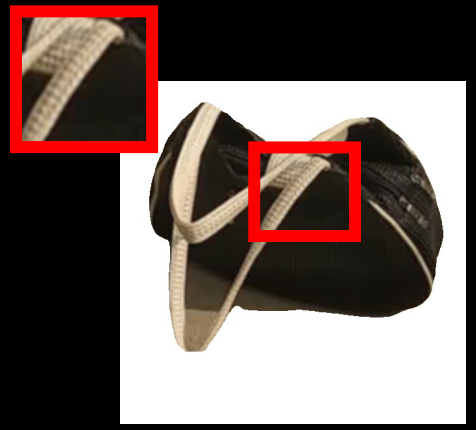
RelPose w/
GT Translations

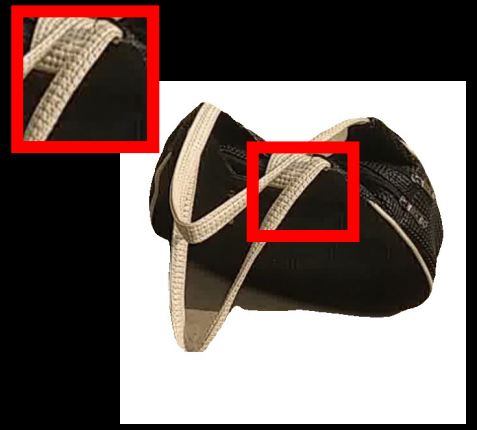
SparsePose

Target Image









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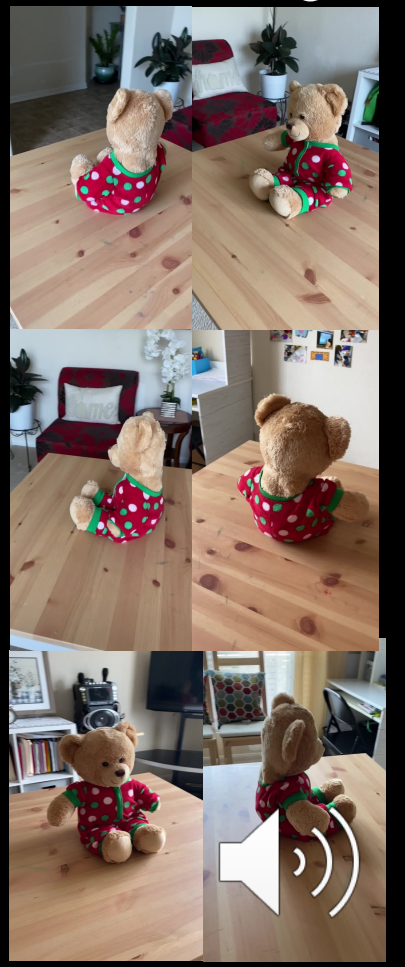

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