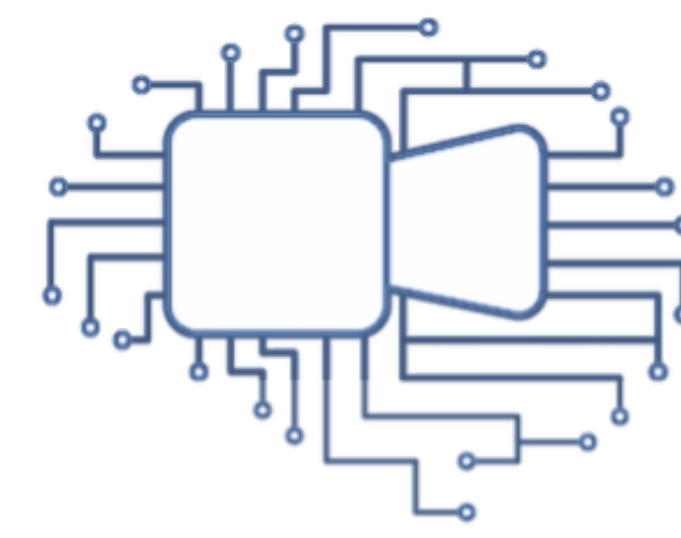


ViewNeRF: Unsupervised Viewpoint Estimation Using Category-Level Neural Radiance Fields



BMVC
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OCTAVE MARIOTTI, OISIN MAC AODHA, HAKAN BILEN
SCHOOL OF INFORMATICS, THE UNIVERSITY OF EDINBURGH



THE UNIVERSITY of EDINBURGH
informatics

CATEGORY VIEWPOINT ESTIMATION

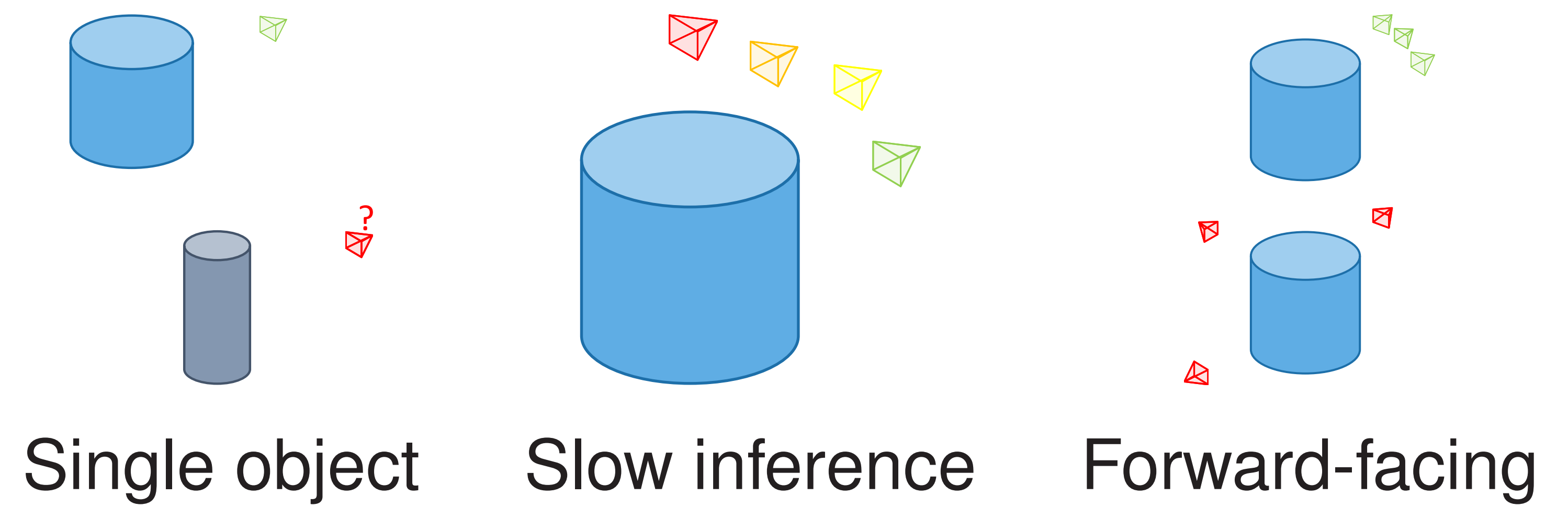
Goal: Recover camera parameter w.r.t. an object category in a self-supervised manner



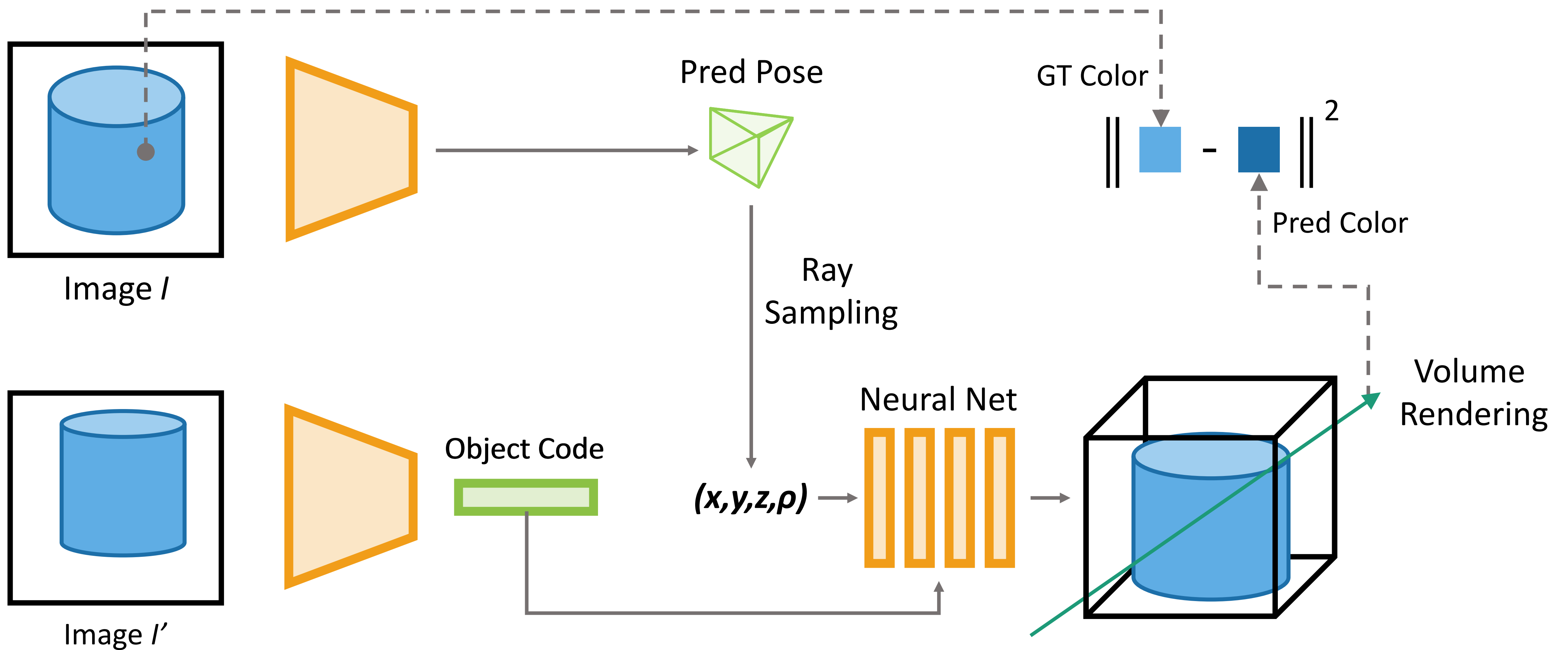
► Use NeRF as the backbone for an analysis-by-synthesis model

STANDARD POSE-FREE NeRF

Pose-free NeRF models exist, but suffer from 3 limitations:

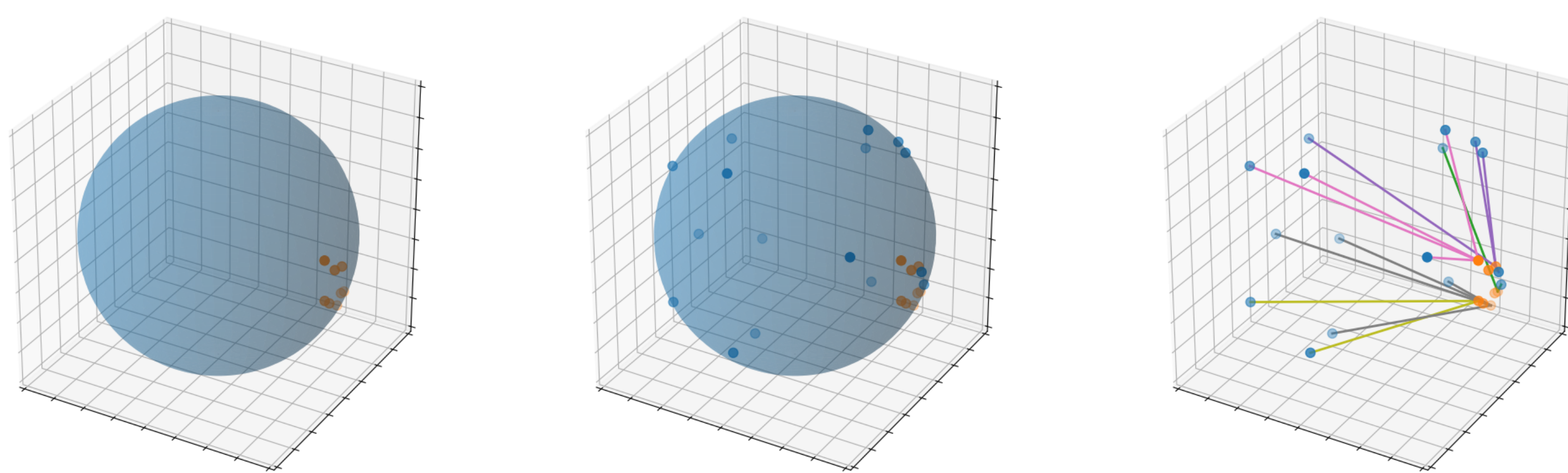


VIEWNeRF ARCHITECTURE



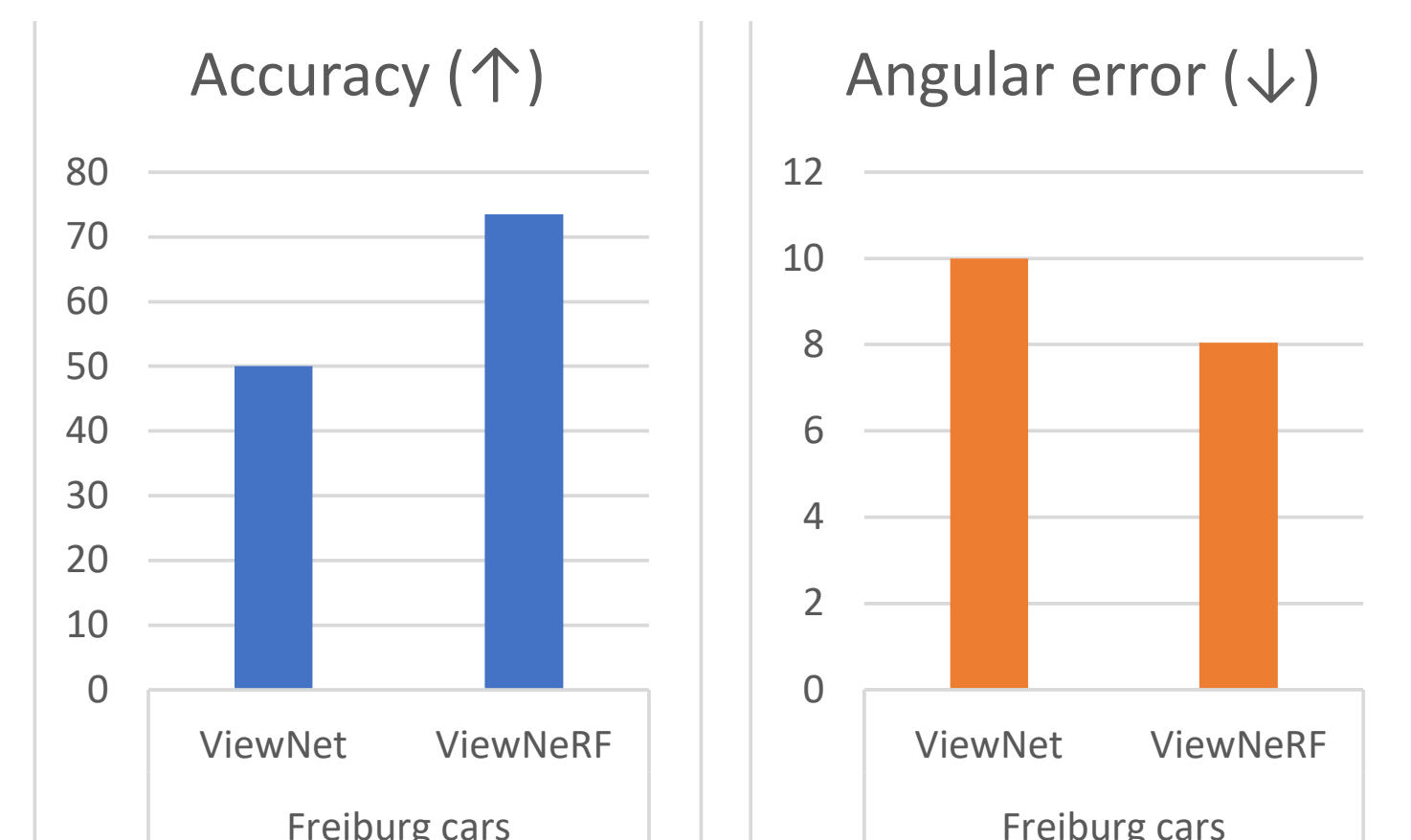
- Neural Network in the NeRF backbone is conditioned on an object code to generalize to multiple instances
- Predicting the pose instead of recovering it via gradient descent allows faster predictions and extends the model to unseen instances

POSE REGULARIZATION FOR 360 SCENES



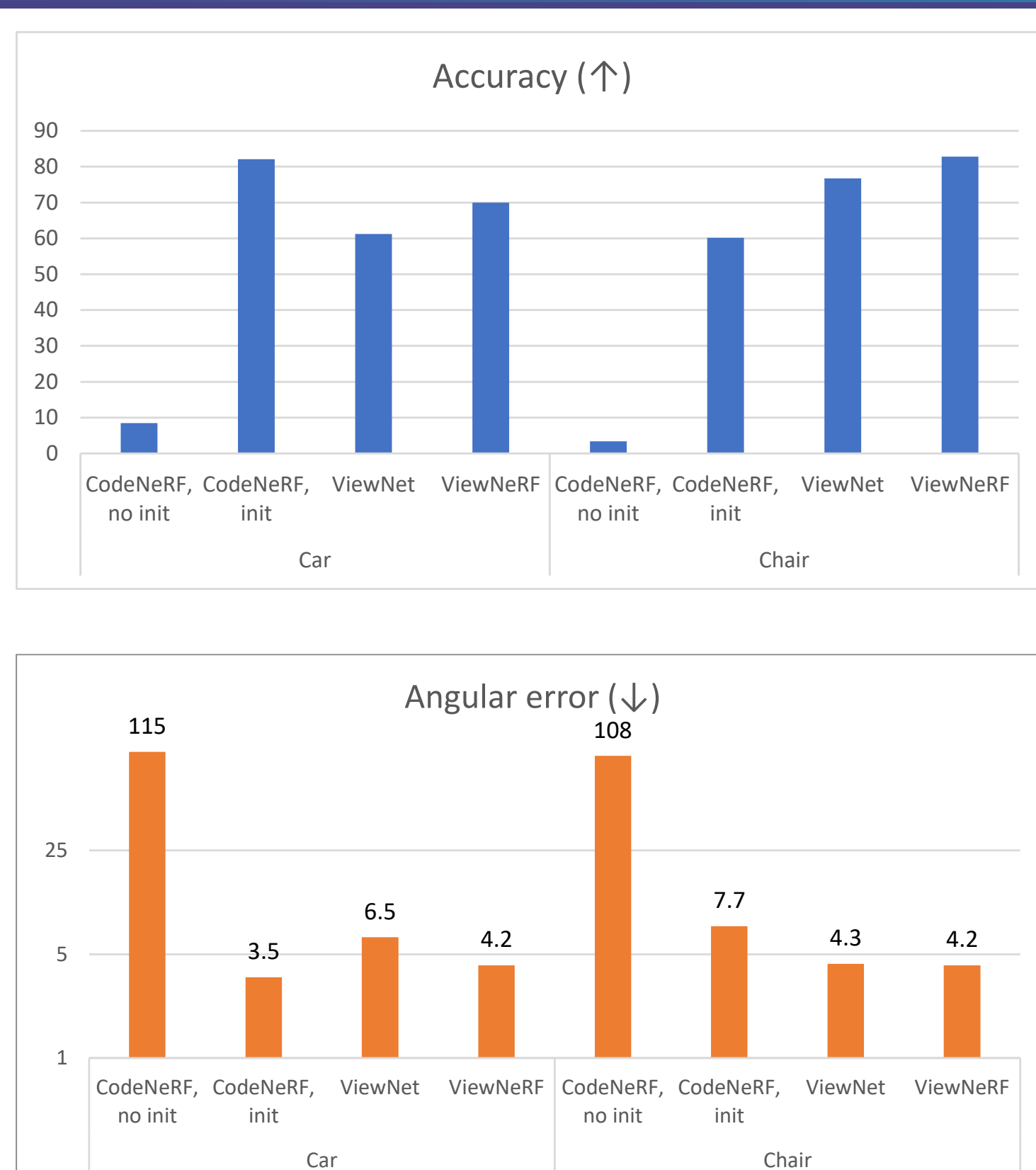
To enforce unbiased pose predictions, pseudo-targets are randomly drawn and assigned to their closest match in the beginning of the training

REAL DATA POSE ESTIMATION



► Large improvement over voxel-based reconstruction thanks to NeRF's realistic rendering

SYNTHETIC POSE ESTIMATION



REAL DATA RECONSTRUCTIONS

