AnyCalib:
On-Manifold Learning for Model-Agnostic Single-View Camera Calibration
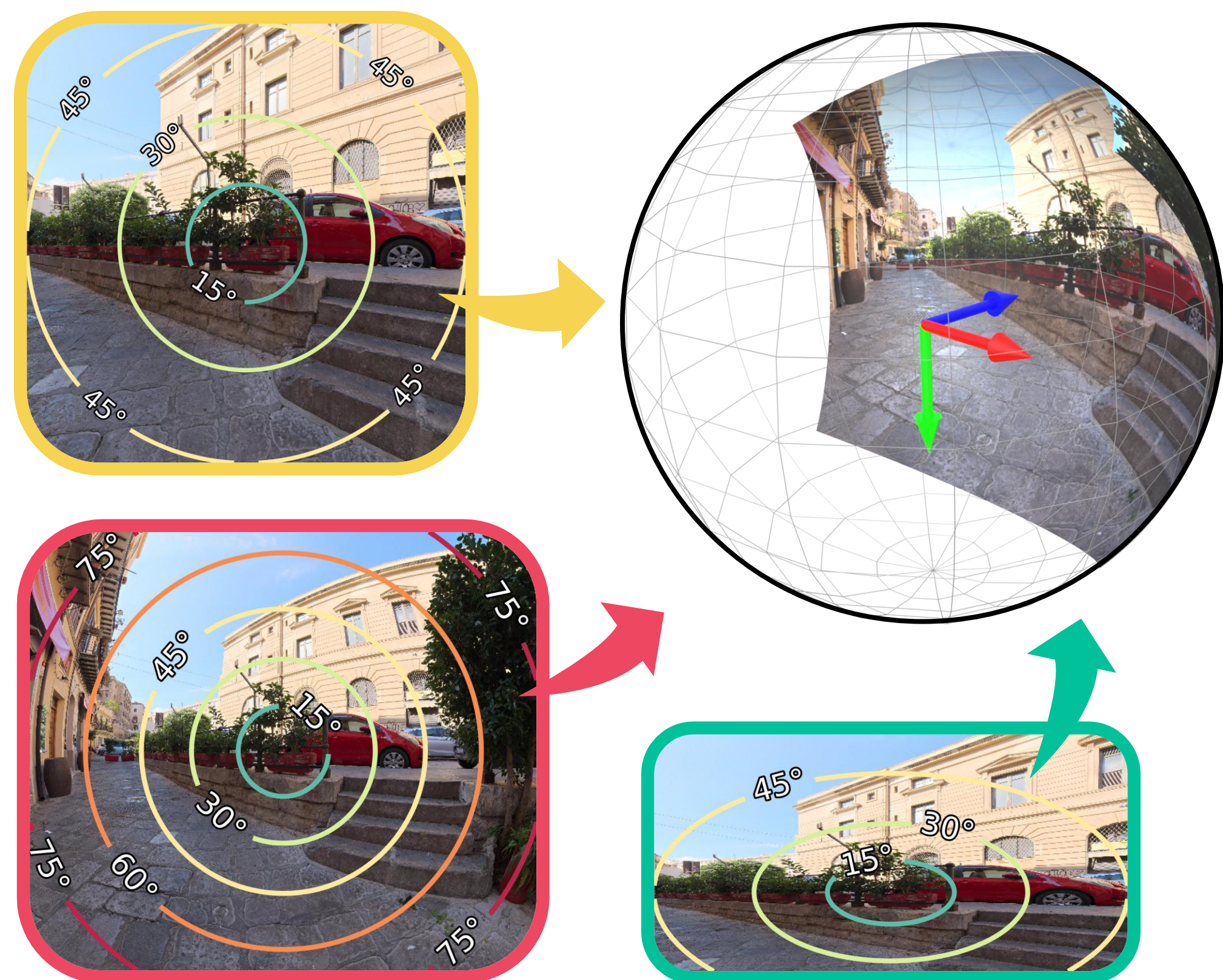
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github.com/javrtg/AnyCalib

Calibration as rays from pixels

For **perspective**, **distorted** & **edited** images

Predicting a **FoV field** + **solving a linear system** to calibrate a camera

Image → DINOv2 → Light–DPT → Convex ups.

FoV field $\in T_{z_1}\mathcal{S}^2$
θ_x θ_y

Rays $= \mathrm{Exp}_{z_1}(\boldsymbol{\theta})$

Intrinsics in closed form
$\mathbf{Ax} = \mathbf{b}$

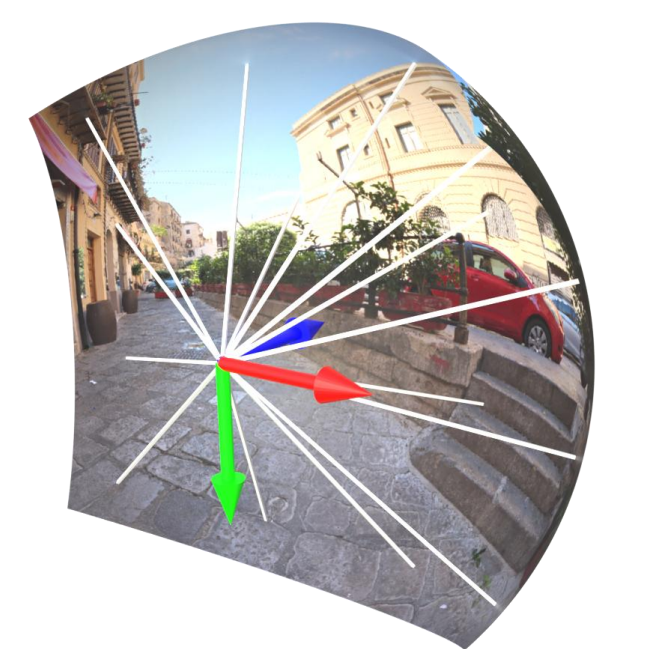

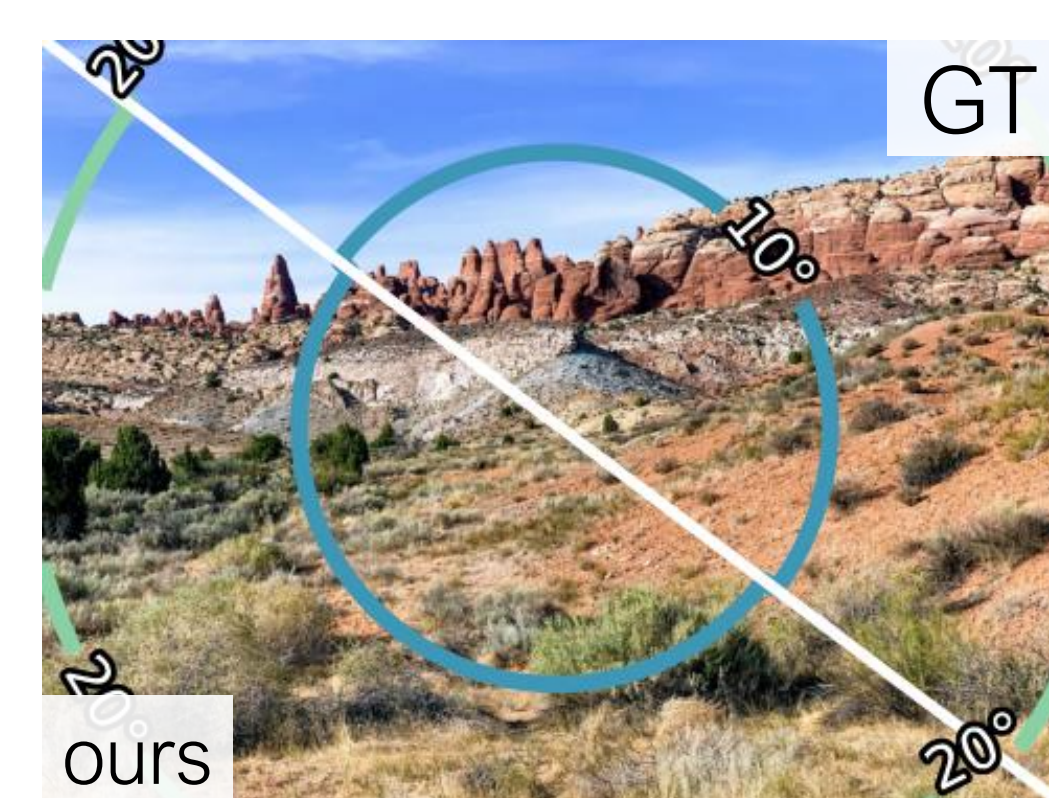## Free Choice of Cam. Model

Pinhole, Radial, KB, UCM, EUCM...

$$\pi(\mathbf{p}) = \begin{bmatrix} u \\ v \end{bmatrix} = f\,\phi(R,Z)\begin{bmatrix} X \\ aY \end{bmatrix} + \begin{bmatrix} c_x \\ c_y \end{bmatrix}$$
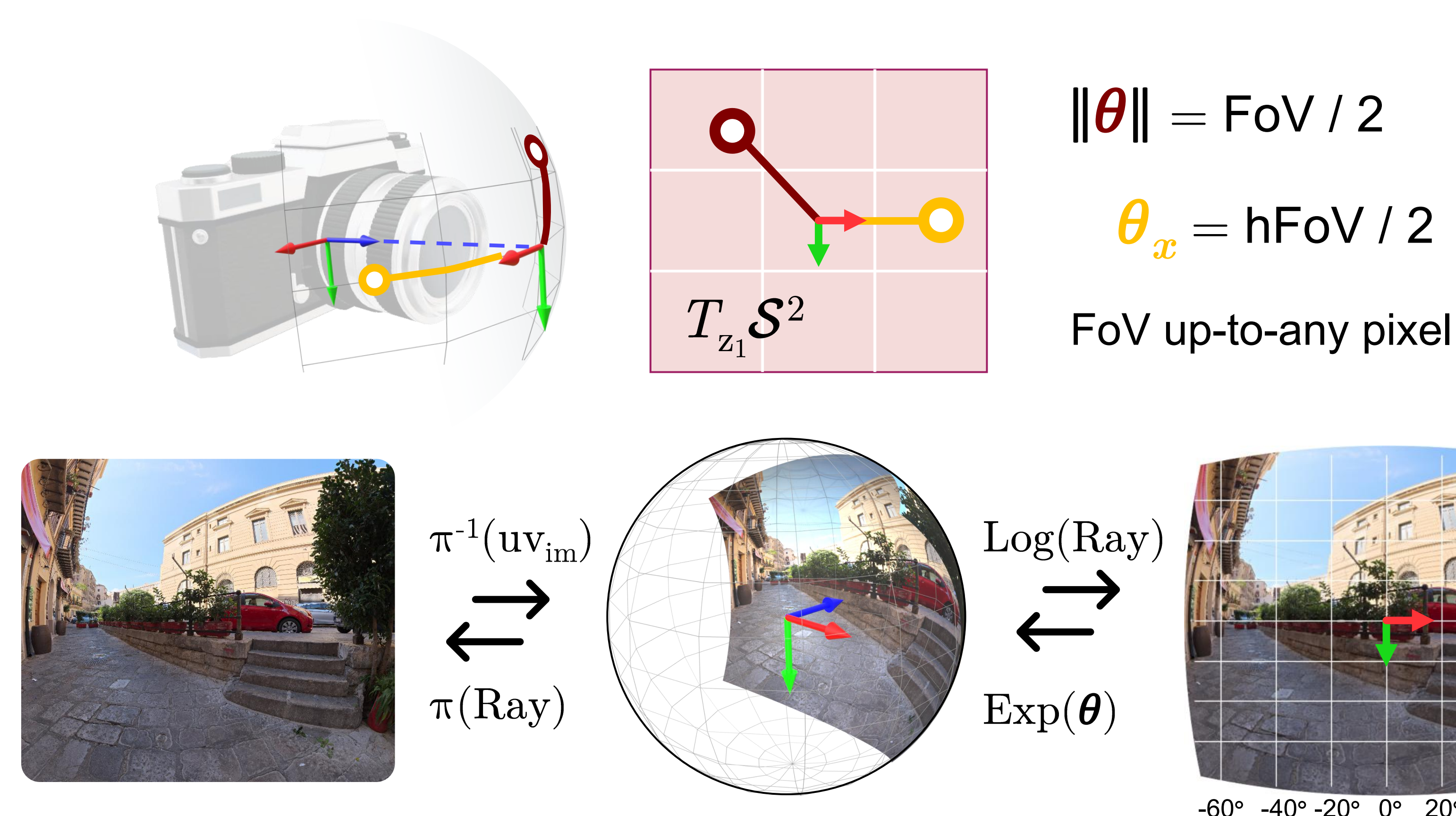
model-agnostic calibration from 2D-Ray correspondences
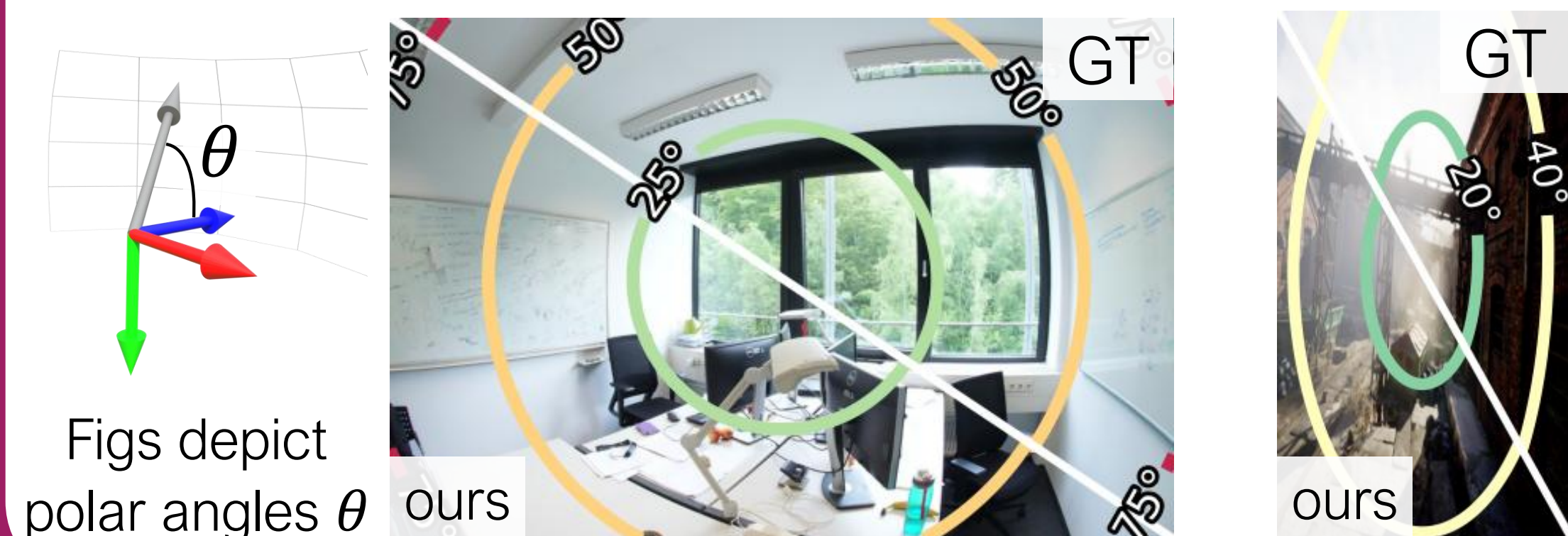
$\mathbf{Ax} = \mathbf{b}$

& w/o clear cues

FoV Field as intermediate representation

$\|\boldsymbol{\theta}\| = $ FoV / 2

$\theta_x = $ hFoV / 2

$T_{z_1}\mathcal{S}^2$

FoV up-to-any pixel

$\pi^{-1}(\mathrm{uv}_{\mathrm{im}})$ ⇌ $\pi(\mathrm{Ray})$
$\mathrm{Log}(\mathrm{Ray})$ ⇌ $\mathrm{Exp}(\boldsymbol{\theta})$

Qualitative examples w. clear cues

(visible parallel lines, vanishing points, horizon...)

θ

Figs depict polar angles θ

Accurate Calibrations

Ang. Error (deg)

Perspective		
Ours	MoGe	GeoCalib
0.9	1.3	1.3

Distorted		
Ours	SVA	GeoCalib
1.8	5.6	4.4

Edited		
Ours	WildCam	DiffCalib
8.9	12.9	14.6

Runtime: 23 ms
(RTX 4090)