Solar Orbiter Images Challenge
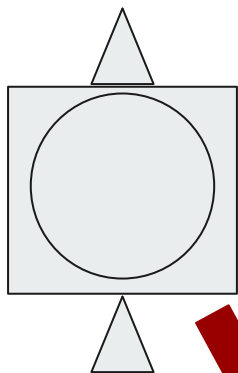
Dr. Sun and his Friends /Marina Andreß, Rico Holz, Birgit Ritter, Baodong Sun, David Werner

Organization Among the Team Dr. Sun and his Friends
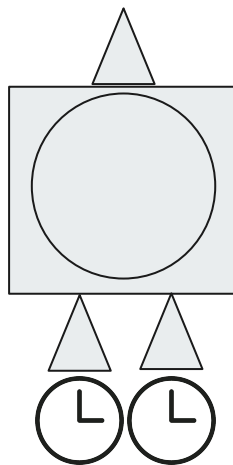
Marina Andreß: CEO

Rico Holz: CFO

Birgit Ritter: COO

Baodong Sun: Target of the study

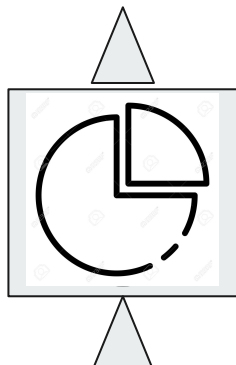David Werner: Senior Intern
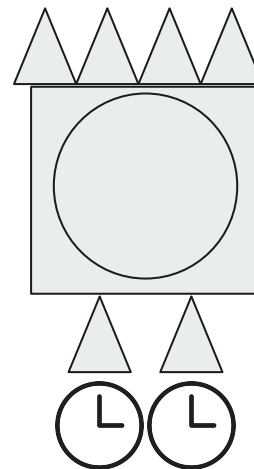
Ansatz - Actual Model

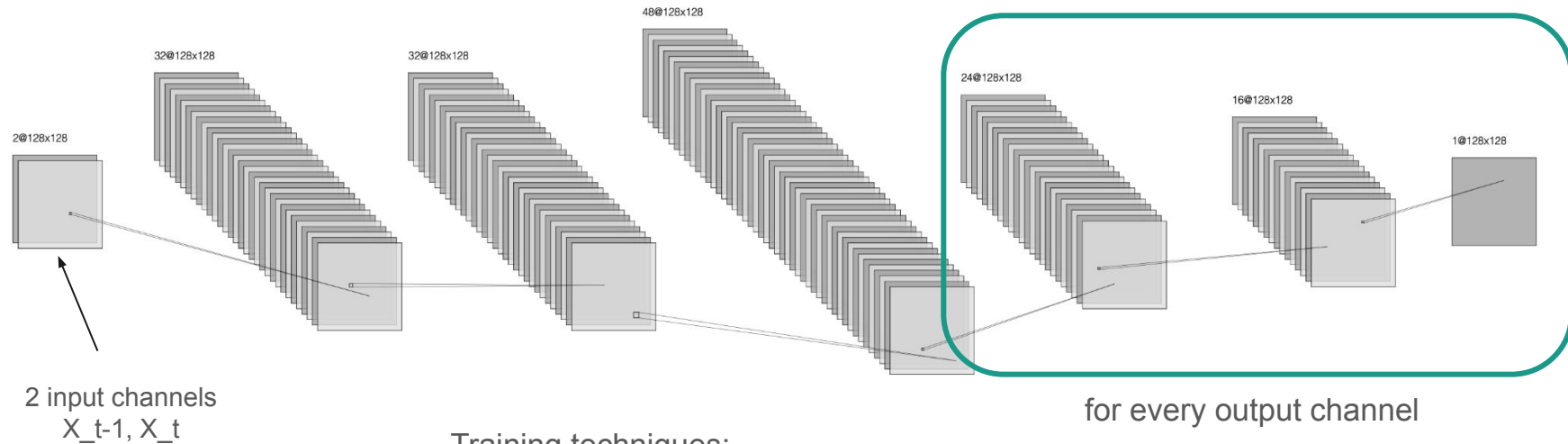

Single head

Single head - Using time information

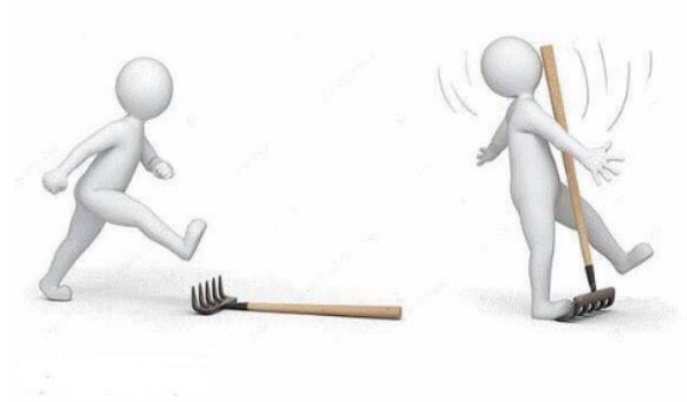Multiple heads

Single head - quarter circle

The model

multihead approach:

48@128x128

32@128x128   32@128x128

2@128x128

24@128x128   16@128x128   1@128x128

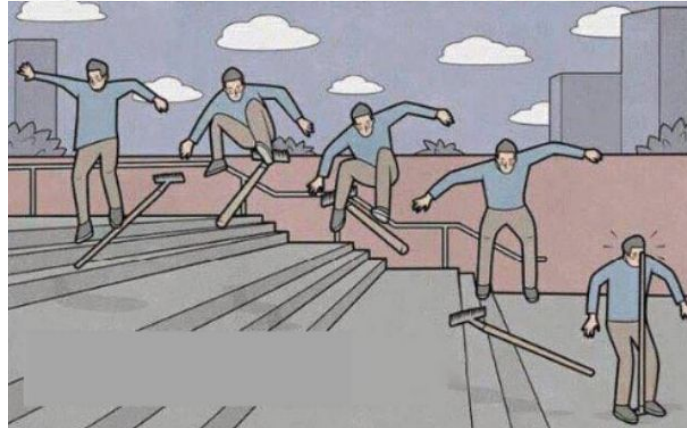2 input channels
X_t-1, X_t

for every output channel

Training techniques:
- batch size = 8
- Early Stopping
- Weight decay regularization

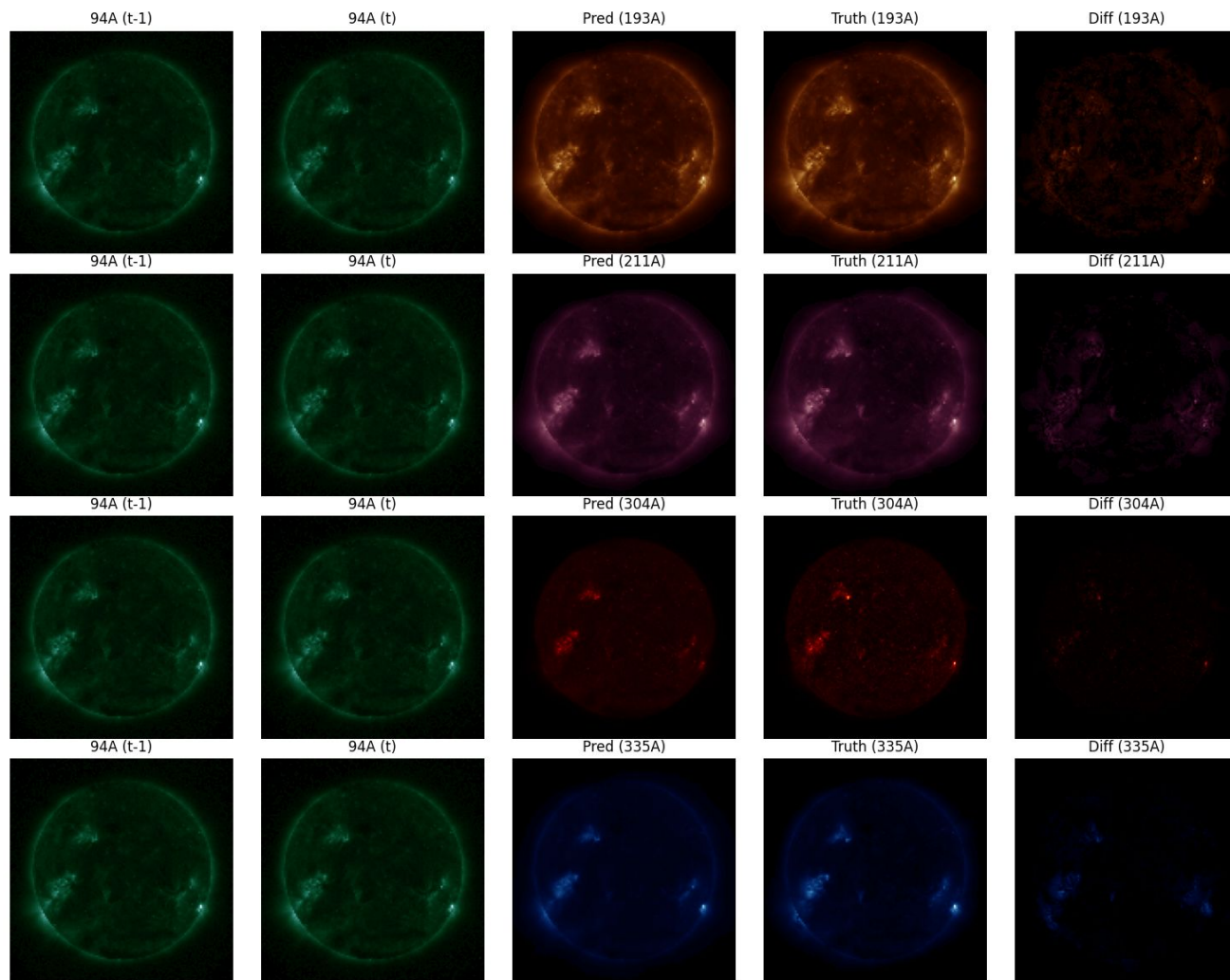Don't think about your model before implementing

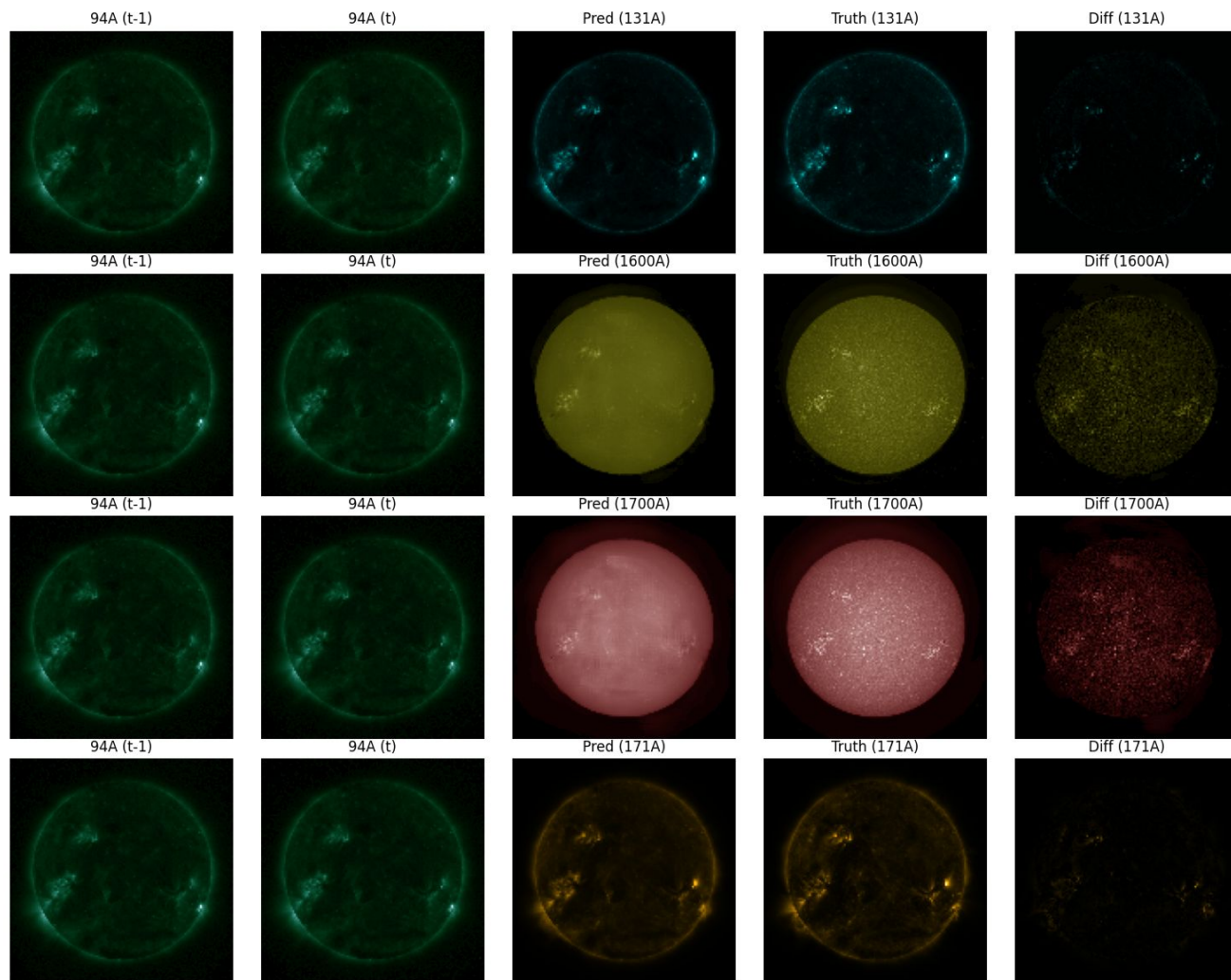Think a lot about your model before implementing

ERUM DATA HUB

25 Epochs

ERUM DATA HUB

Training vs Validation Loss (Sum over Heads)

Train MSE+Sobel = 0.00101720
Eval Sum MSE+Sobel = 0.00104717
Train Base MSE = 0.00034605

ERUM DATA HUB
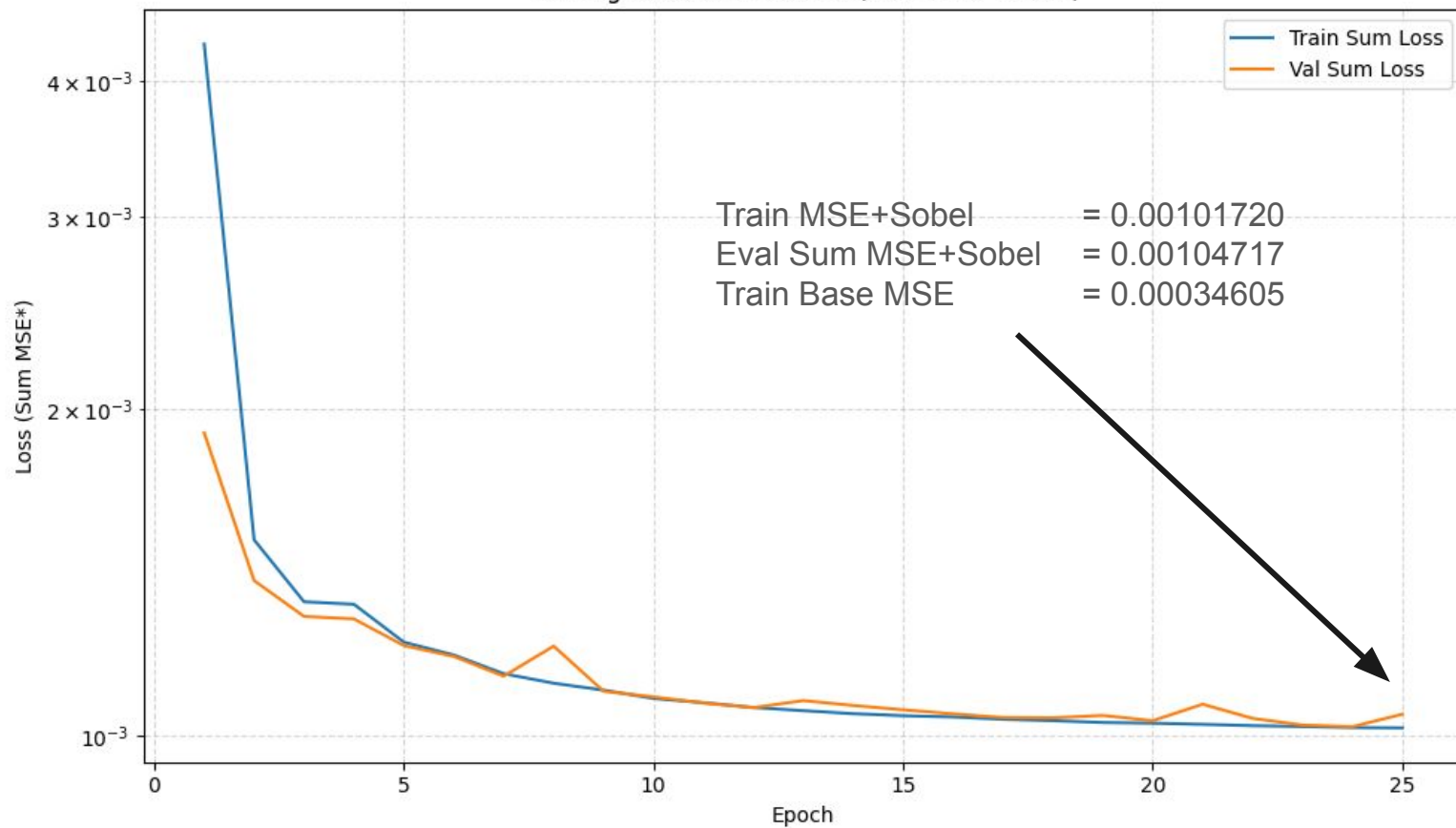
Important:

- Snapshotting!
- Sanity Checks!
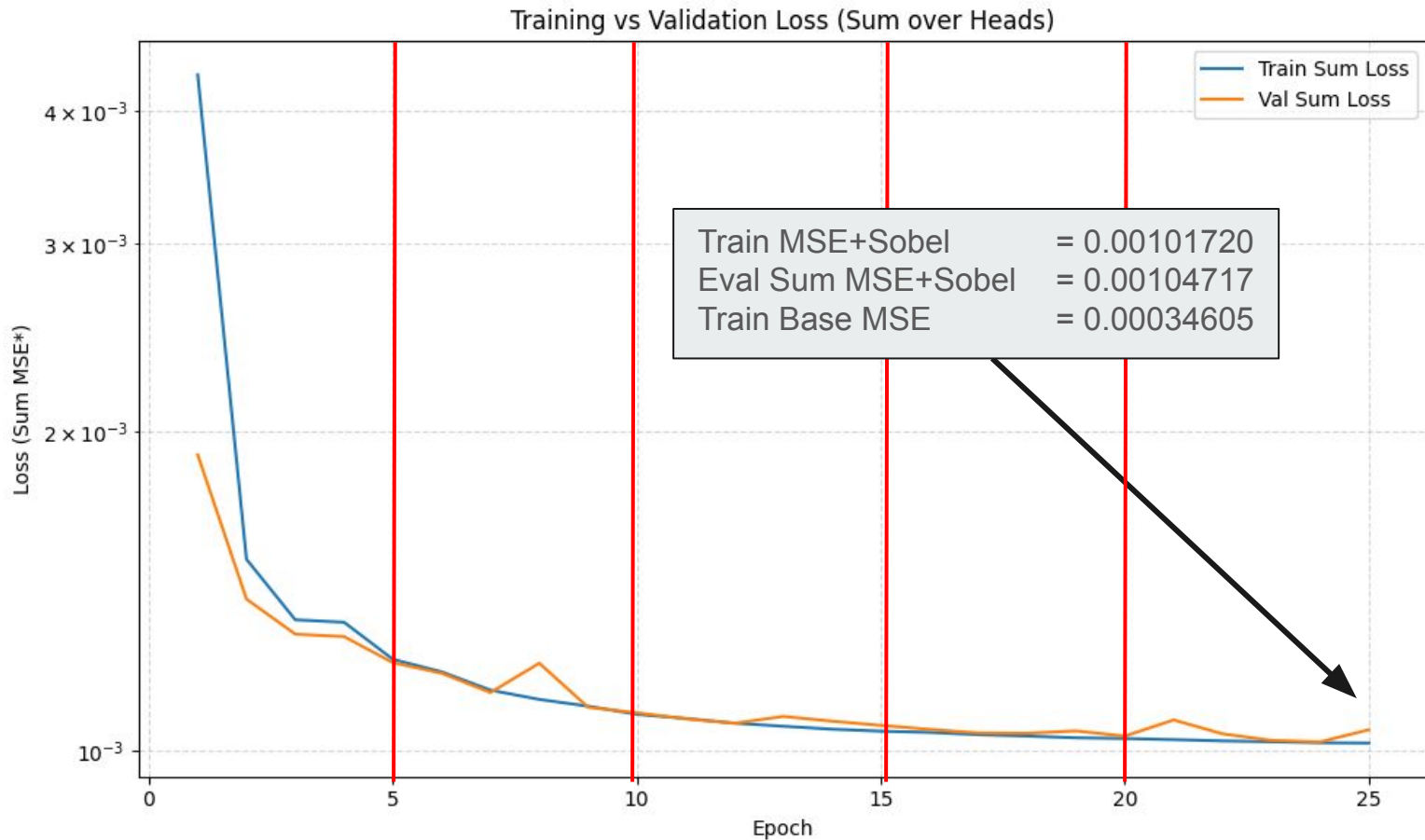
Training vs Validation Loss (Sum over Heads)

— Train Sum Loss
— Val Sum Loss

Train MSE+Sobel	= 0.00101720
Eval Sum MSE+Sobel	= 0.00104717
Train Base MSE	= 0.00034605

Environmental Impact

Model only training on one filter: **1.2 g** CO_2/epoche, 56 s/epoche

↓ x5.7   ↓ x6.2

Model training on all 8 filters: **6.8 g** CO_2/epoche, 348s/epoche

-> More efficient to directly train together

probably because of the shared weights

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equivalent to brewing 2 cups of coffee

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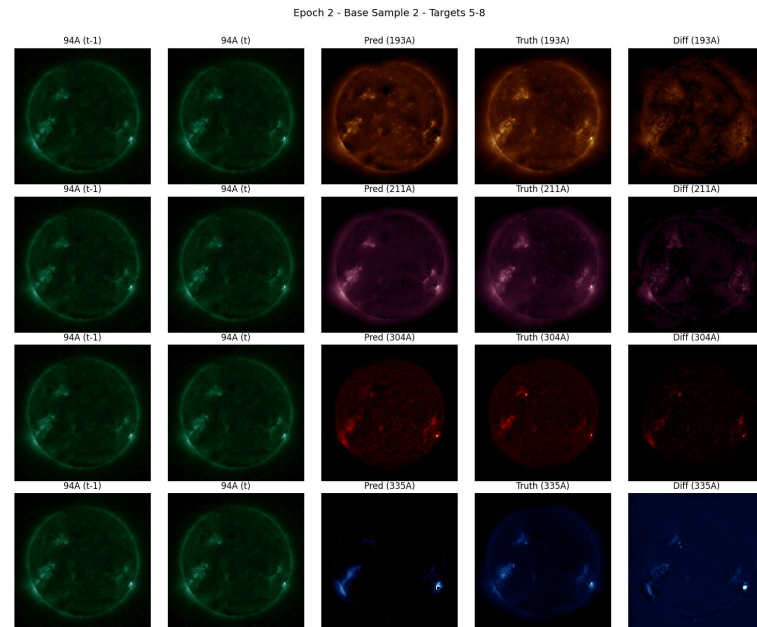Final model trained for 25 epochs:

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equivalent to brewing 2 cups of coffee

We drank about 10 cups of coffee :(

Outlook

- HyperParameter - Bayes Search

- Internal log scaling (human perception - DANGEROUS: Purpose?)

- U-net (better capture locality + larger scale features)

- Better augmentation: Noise, Micro–rotations

- GAN in training

Epoch 2 - Base Sample 2 - Targets 5-8

Backup

Multi-Head Solar CNN