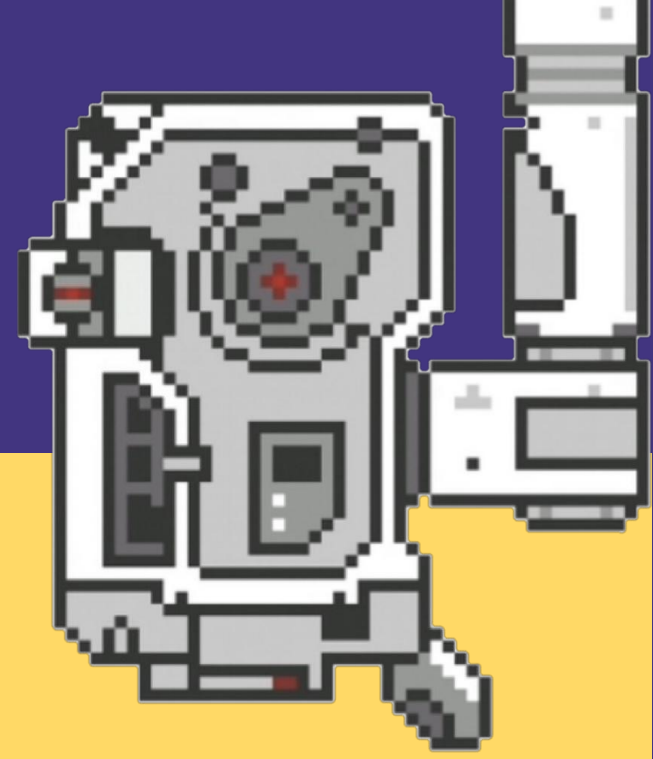
GALMOSS:

TORCH-BASED GALAXY LIGHT PROFILE FITTING



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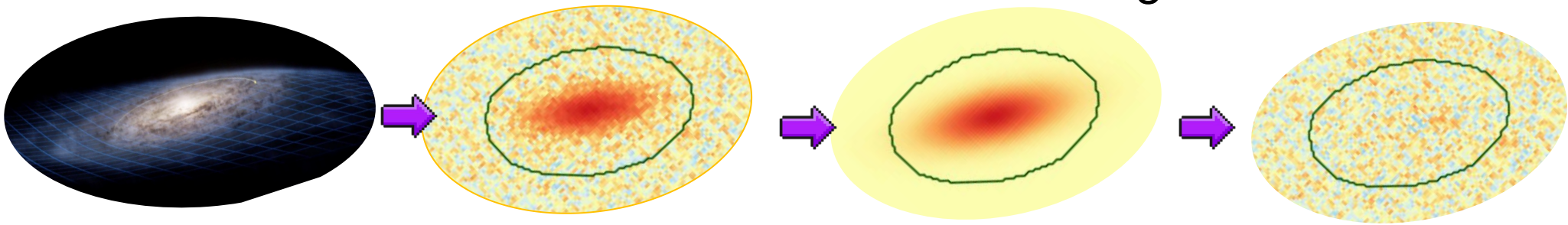
2023.09.25 YICHANG, CHI

GALAXY STRUCTURES

Galaxies are cosmic building blocks composed by various morphological structures, each embodying a unique evolutionary path.

GALAXY DECOMPOSITION

Light Profile fitting



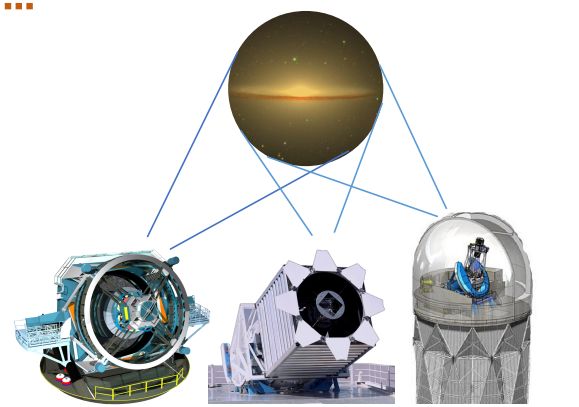
tradition GALFIT, IMFIT, PROFIT, GIM2D ...

ENORMOUS VOLUME OF DATA?

pipelines (PYMORPH)

deep learning (DEEPLEGATO)

GPU acceleration -- GALMOSS



lsst.org sdss.org desi.lbl.gov

GALMOSS: TORCH-BASED, GRADIENT-DESCENT, CHI^2

ACCELERATION:

forward process: large scale matrix multiplication

backward process: auto-differentiation

METHODOLOGY:

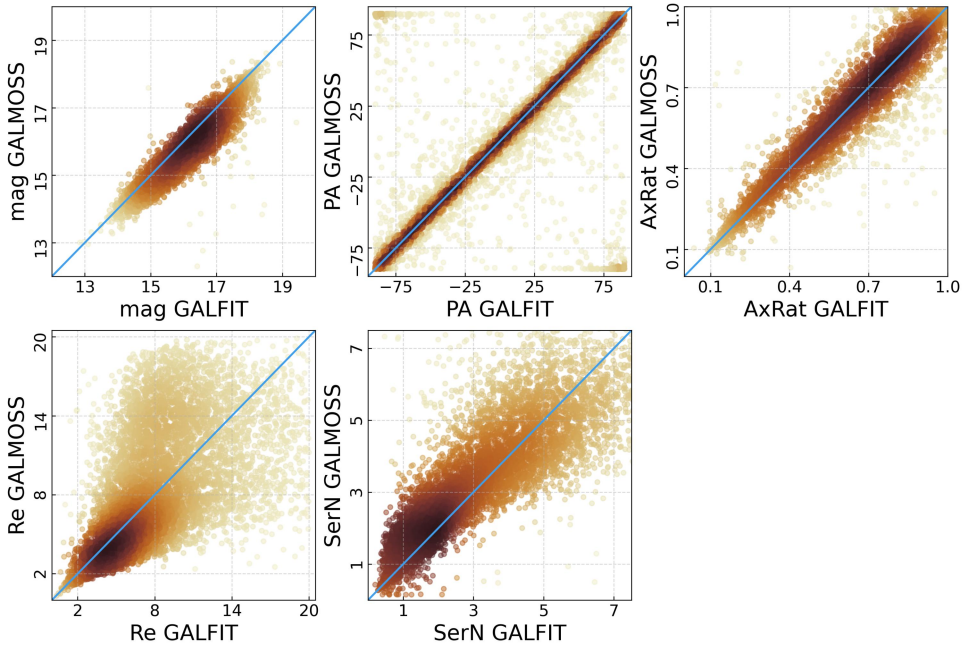
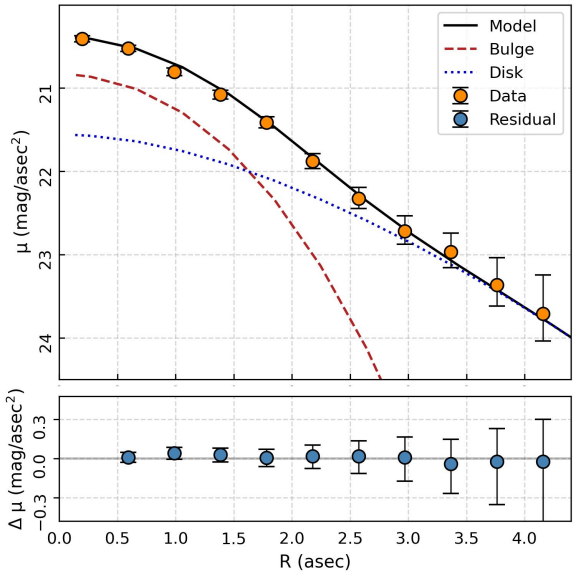
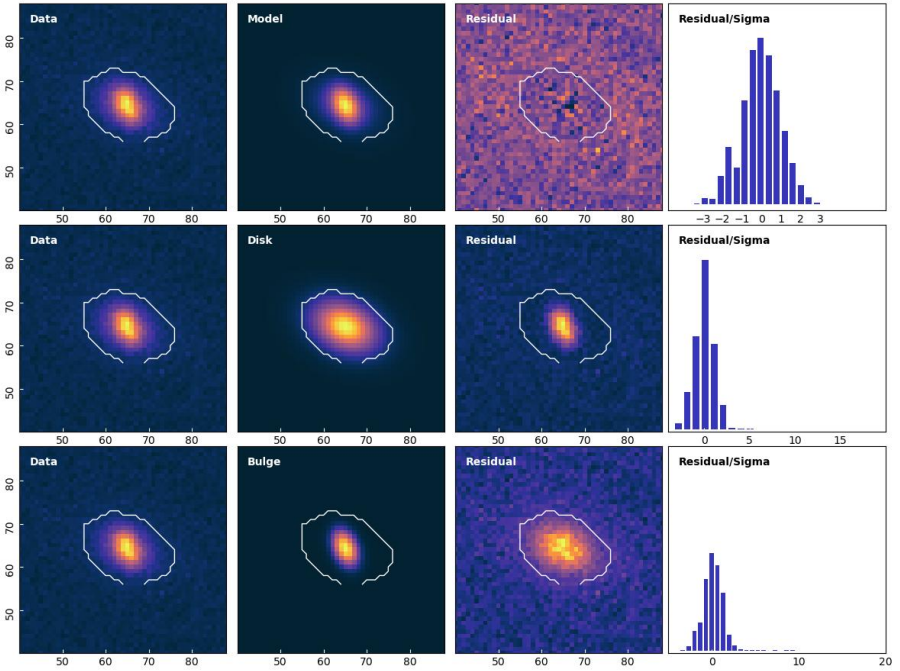
fast, accurate, reduce memory usage

- **UNCERTAINTY:** bootstrap, covariance matrix

user-friendly in parallel fitting

GALMOSS:

1. A turborcharged GPU-based galaxy profile fitting
2. A tradeoff balancing speed and physical intrinsic

3 s for each galaxy?

8,000 galaxies in 15 mins!! (0.11 for each)