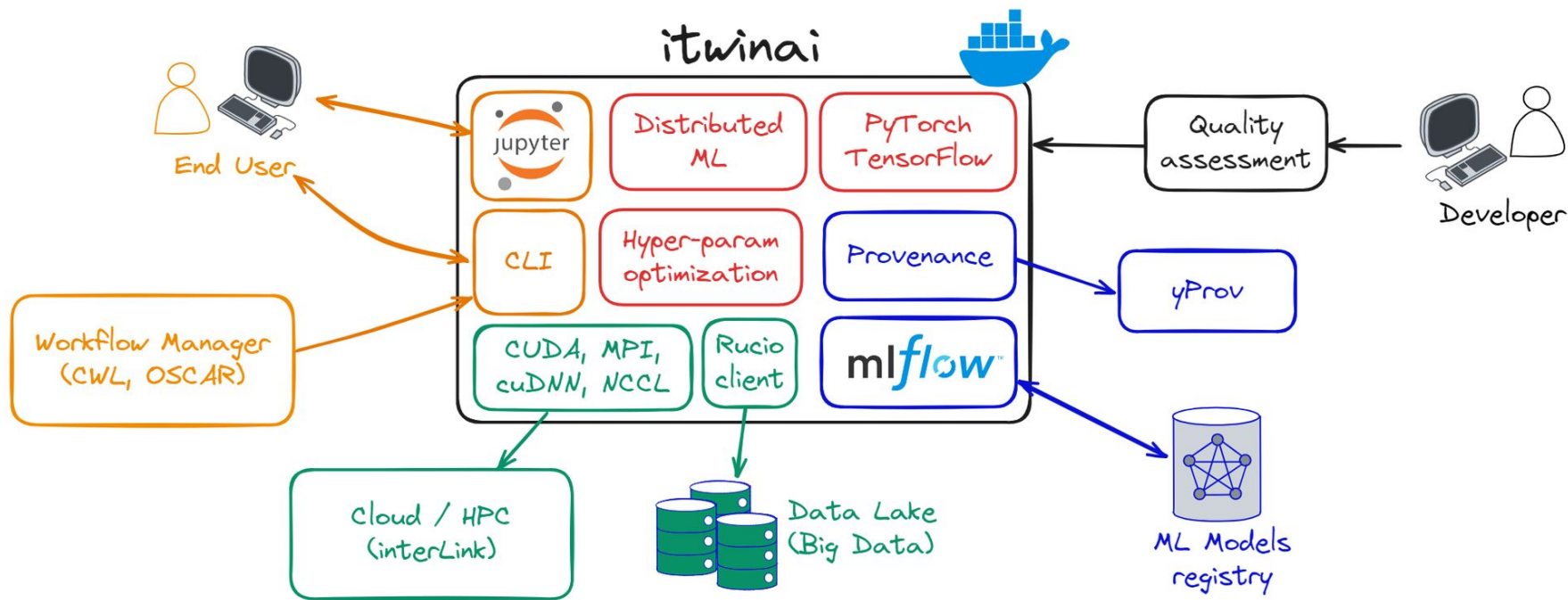# Interdisciplinary Digital Twin Engine interTwin
for calorimeter simulation

Corentin Allaire, Vera Maiboroda, David Rousseau,

Matteo Bunino, Jarl Saether, Kalliopi Tsolaki

✍️ **interTwin** provides instruments that simplify AI-based Digital Twins development

- **Fast calorimeter simulation** is crucial for LHC experiments
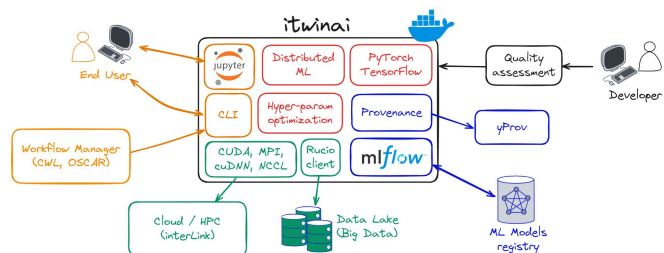
Lots of simulations under limited computing resources?

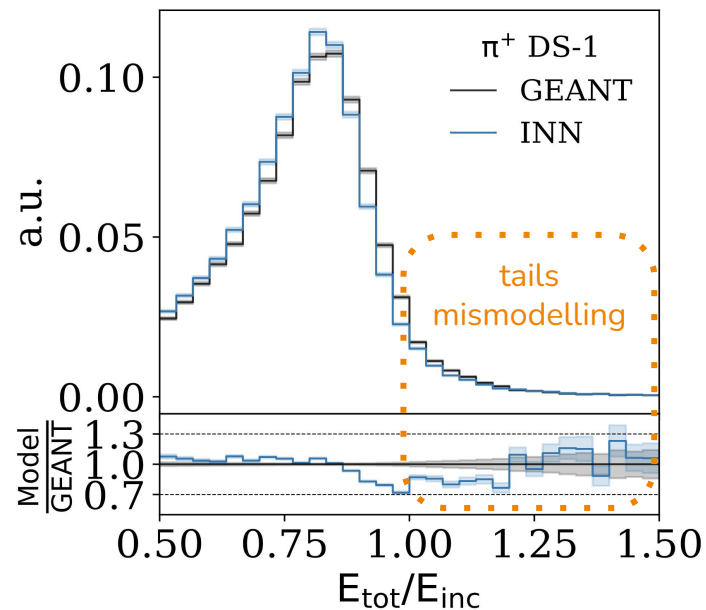✨ Generative AI models ✨

Generative models from CaloChallenge:

2308.03876 ←	CaloDiffusion	iCaloFlow teacher → 2305.11934
2405.20407 ← {	L2LFlows MAF	iCaloFlow student
	conv. L2LFlows	SuperCalo → 2308.11700
2312.09290 ←	CaloVAE+INN	CaloMan → 2211.15380
2408.04997 ←	MDMA	CaloLatent → ML4PS@NeurIPS
2309.05704 ←	CaloClouds	BoloGAN → ATL-SOFT-PUB-2020-006
2402.11575 ←	CaloGraph	DNN CaloSim → 2210.06204
2405.06605 ← {	Calo-VQ	CaloDiT → @ACAT
	Calo-VQ(norm)	GEANT4 transformer → EPJ Web Conf
2312.09290 ←	CaloINN	DeepTree → 2312.00042
	CaloScore	CaloForest → 2408.16046
2308.03847 ← {	CaloScore distilled	CaloPointFlow → 2403.15782
	CaloScore single-shot	CaloShowerGAN
2405.09629 ←	CaloDREAM	CaloShower2GAN → 2309.06515
2210.14245 ← {	CaloFlow teacher	CaloShower3GAN
	CaloFlow student	GEANT4

arxiv.org/abs/2410.21611

- Looking for ways to improve the generation quality by addressing tails mismodelling with CaloINN model implemented in interTwin

- Full integration with interTwin

- Validating CaloINN with Open Data Detector

- Refine CaloINN's distribution tails

A0 poster board

Poster session Wednesday 12:00 - 15:00 (Session A)

A0 Poster board

**T HOTEL
Conference Centre
Sale T 1 - T 2 - T 3**

RECEPTION

141	27	21	78	45	126	191	41	179	57
160	108	26	193	71	161	38	63	40	163

SALA ESPOSITIVA

Here

66	18	144	111	190	113	75	34	19	183
82	30	13	136	196	131	81	44	23	16

96
142

Refine CaloINN's distribution tails