

FlashSim: September status report

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External Partner











Who we are

Staff members:

- Alessandro Bombini ^j, INFN
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- Simone Capelli ^a, Università Milano Bicocca
- Federica Maria Simone ⁱ, Politecnico di Bari
- Nicola De Filippis ⁱ, Politecnico di Bari
- Vieri Candelise ^h, Università di Trieste
- Giuseppe Della Ricca ^h, Università di Trieste
- Valentina Zaccolo ^k, Università di Trieste
- Mattia Faggin ^k, Università di Trieste
- Lorenzo Rinaldi ^e, Università di Bologna
- Piergiulio Lenzi ^g, Università di Firenze
- Vitaliano Ciulli ^g, Università di Firenze
- Sharam Rahatlou^h, Università Roma 1
- Daniele del Re ^h, Università Roma 1
- Lorenzo Capriotti ^f, Università di Ferrara
- Francesco Conventi ^e, Università di Napoli
- Francesco Cirotto ^e, Università di Napoli

PhD students:

- Francesco Vaselli ^c, Scuola Normale Superiore di Pisa
- o Matteo Barbetti ^b, Università di Firenze
- Muhammad Numan Anwar ^j, Politecnico di Bari
- o Benedetta Camaiani ^g, Università di Firenze
- Alkis Papanastassiou ^g, Università di Firenze
- Antonio D'Avanzo ^e, Università di Napoli

External collaborators:

• Andrea Rizzi ^c, Università di Pisa



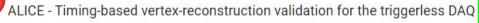






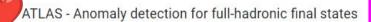
Ongoing activities





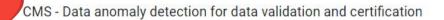








CMS - Theory-independent classifiers for CMS using domain adaptation





LHCb - Lamarr (Flashsim) - PID and Calorimetry



LHCb - Lamarr (Flashsim) - Tracking



LHCb - Parametrization of Cherenkov detector path inRICH detectors



LHCb - Flash simulation of resistive solid-state detectors

LHCf - Reconstruction of multiple calorimetric clusters

Thanks to **everyone** for replying to the heart-beat survey. To me, it counts as the first successful cornerstone of the flagship! **Simulation** Reconstruction **Monitoring Data analysis**









Products so far

- Recent conference contributions
 - o Lamarr @ CHEP, indico.jlab.org/event/459/contributions/11454/
 - CMS anomaly detection for DAQ @ LHCP, indico.cern.ch/event/1198609/contributions/5340126/
- (New) papers
 - CMS Anomaly detection, <u>cds.cern.ch/record/2854697?ln=en</u>
 - o Domain adaptation for CMS, doi:org/10.1140/epic/s10052-022-10871-3
- (New) repositories
 - o github.com/landerlini/lb-trksim-train
 - github.com/LamarrSim
 - o github.com/mfaggin/monitorPvML hpc
 - o github.com/fsimone91/ML4DQMDC-PixelAE
 - o github.com/mbarbetti/pidgan
 - o github.com/mbarbetti/calotron









KPIS

KPI ID	Description	Acceptance threshold	2023-09-26
KPI2.2.1.1	N _{MC} billion events obtained from ML-based simulation, as demonstrated by official links in experiments' simulation databases	N _{MC} >= 1	0 events (completed: 0%)
KPI2.2.1.2	N _{EXP} experiments have tested a machine-learning based simulation	N _{EXP} >= 2	0 experiment (completed: 0%)
KPI2.2.1.3	Machine-learning use-cases tested in the context of the CN were presented at N _{CONF} international and national events	N _{CONF} >= 3	0 use-cases (since Sept. '23) (completed: 0%)
KPI2.2.1.4	N _{UC} different machine-learning use-cases were tested in the context of the CN and made available in git repositories		2 use-cases (completed: 40%)









n resources

The HPC bubbles requested by this flagship should be commissioned by summer 2024.

In the meanwhile:

Compute:

- ML INFN is providing GPUs for **interactive development** (no batch)
- some of us is starting playing with *Leonardo Booster* for practicing <u>ML with batch jobs</u> (spoke, please clarify rules and procedures)
- ML INFN plans for experimental support for batch jobs since early 2024, (but very tight schedule)

Storage:

- cache and ephemeral storage is available through INFN Cloud (few TB)
- "permanent" storage for data relevant for audit under discussion, for the time being, we are encouraged using minio.cloud.infn.it

Get in touch! The machinering is slowly starting to spin, since getting accustomed to the environment may require time, if you plan to use ICSC resources at some point, we suggest you start practicing with the temporary, resource-limited environment we have now.