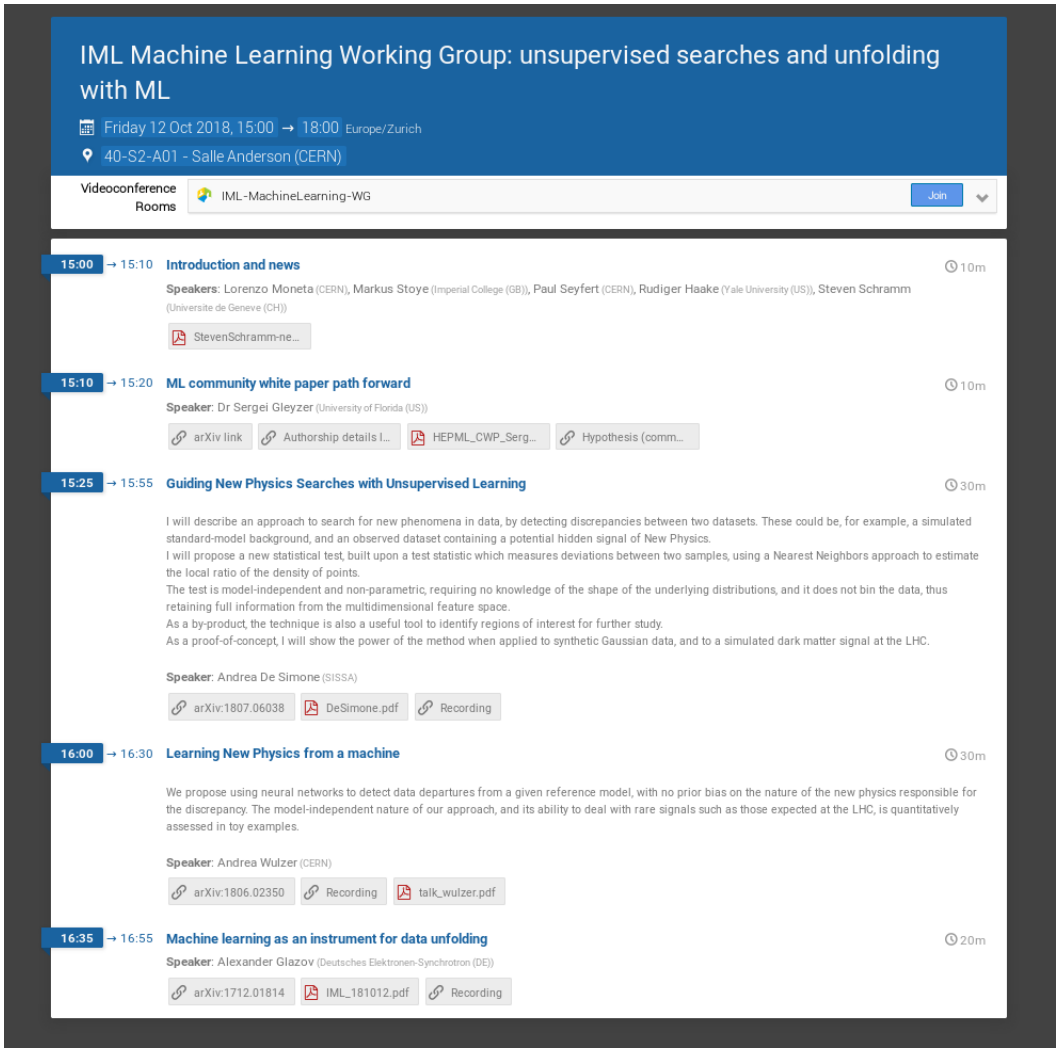
IML meeting – NEWS

Lorenzo Moneta (CERN) Markus Stoye (Imperial College, DSI)
Paul Seyfert (CERN) Rüdiger Haake (Yale University)
Steven Schramm (Université de Genève)

HEP Software Foundation – Community White Paper

- editing meeting on Friday
  - writeme

Recordings online



IML Machine Learning Working Group: unsupervised searches and unfolding with ML

Friday 12 Oct 2018, 15:00 → 18:00 Europe/Zurich

40-S2-A01 - Salle Anderson (CERN)

Videoconference Rooms: IML-MachineLearning-WG — Join

15:00 → 15:10 Introduction and news — 10m

Speakers: Lorenzo Moneta (CERN), Markus Stoye (Imperial College (GB)), Paul Seyfert (CERN), Rudiger Haake (Yale University (US)), Steven Schramm (Universite de Geneve (CH))

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15:10 → 15:20 ML community white paper path forward — 10m

Speaker: Dr Sergei Gleyzer (University of Florida (US))

arXiv link | Authorship details l... | HEPML_CWP_Serg... | Hypothesis (comm...

15:25 → 15:55 Guiding New Physics Searches with Unsupervised Learning — 30m

I will describe an approach to search for new phenomena in data, by detecting discrepancies between two datasets. These could be, for example, a simulated standard-model background, and an observed dataset containing a potential hidden signal of New Physics.
I will propose a new statistical test, built upon a test statistic which measures deviations between two samples, using a Nearest Neighbors approach to estimate the local ratio of the density of points.
The test is model-independent and non-parametric, requiring no knowledge of the shape of the underlying distributions, and it does not bin the data, thus retaining full information from the multidimensional feature space.
As a by-product, the technique is also a useful tool to identify regions of interest for further study.
As a proof-of-concept, I will show the power of the method when applied to synthetic Gaussian data, and to a simulated dark matter signal at the LHC.

Speaker: Andrea De Simone (SISSA)

arXiv:1807.06038 | DeSimone.pdf | Recording

16:00 → 16:30 Learning New Physics from a machine — 30m

We propose using neural networks to detect data departures from a given reference model, with no prior bias on the nature of the new physics responsible for the discrepancy. The model-independent nature of our approach, and its ability to deal with rare signals such as those expected at the LHC, is quantitatively assessed in toy examples.

Speaker: Andrea Wulzer (CERN)

arXiv:1806.02350 | Recording | talk_wulzer.pdf

16:35 → 16:55 Machine learning as an instrument for data unfolding — 20m

Speaker: Alexander Glazov (Deutsches Elektronen-Synchrotron (DE))

arXiv:1712.01814 | IML_181012.pdf | Recording

- Instead of written minutes we now organise recordings for talks
- (with approval by the speaker, not automatically)
- e.g. last meeting's talks accessible on the indico agenda
- Big thanks to the recording service

Upcoming events

2018-10-31 Data science seminar: Full Event Interpretation at Belle 2

2018-11-30 Next IML meeting (Filtration plant 222/R-001)

Today's meeting

IML Machine Learning Working Group: unsupervised searches, part 2

Tuesday 30 Oct 2018, 15:00 → 18:00 Europe/Zurich

500-1-001 - Main Auditorium (CERN)

Videoconference Rooms: IML-MachineLearning-WG — Join

15:00 → 15:10 **Introduction and news** — 10m

Speakers: Lorenzo Moneta (CERN), Markus Stoye (Imperial College (GB)), Paul Seyfert (CERN), Rudiger Haake (Yale University (US)), Steven Schramm (Universite de Geneve (CH))

15:15 → 15:35 **Searching for new physics without knowing the signal model** — 20m

Speakers: Jeroen Schouwenberg (Nikhef National institute for subatomic physics (NL)), Sascha Caron (Nikhef National institute for subatomic physics (NL)), Simone Amoroso (Deutsches Elektronen-Synchrotron (DE))

15:40 → 16:00 **CWoLa hunting** — 20m

Speakers: Ben Nachman (Lawrence Berkeley National Lab. (US)), Jack Collins (University of Maryland and Johns Hopkins University)

16:05 → 16:25 **QCD or What?** — 20m

arXiv:1808.08979

Speaker: Jennifer Thompson (ITP Heidelberg)

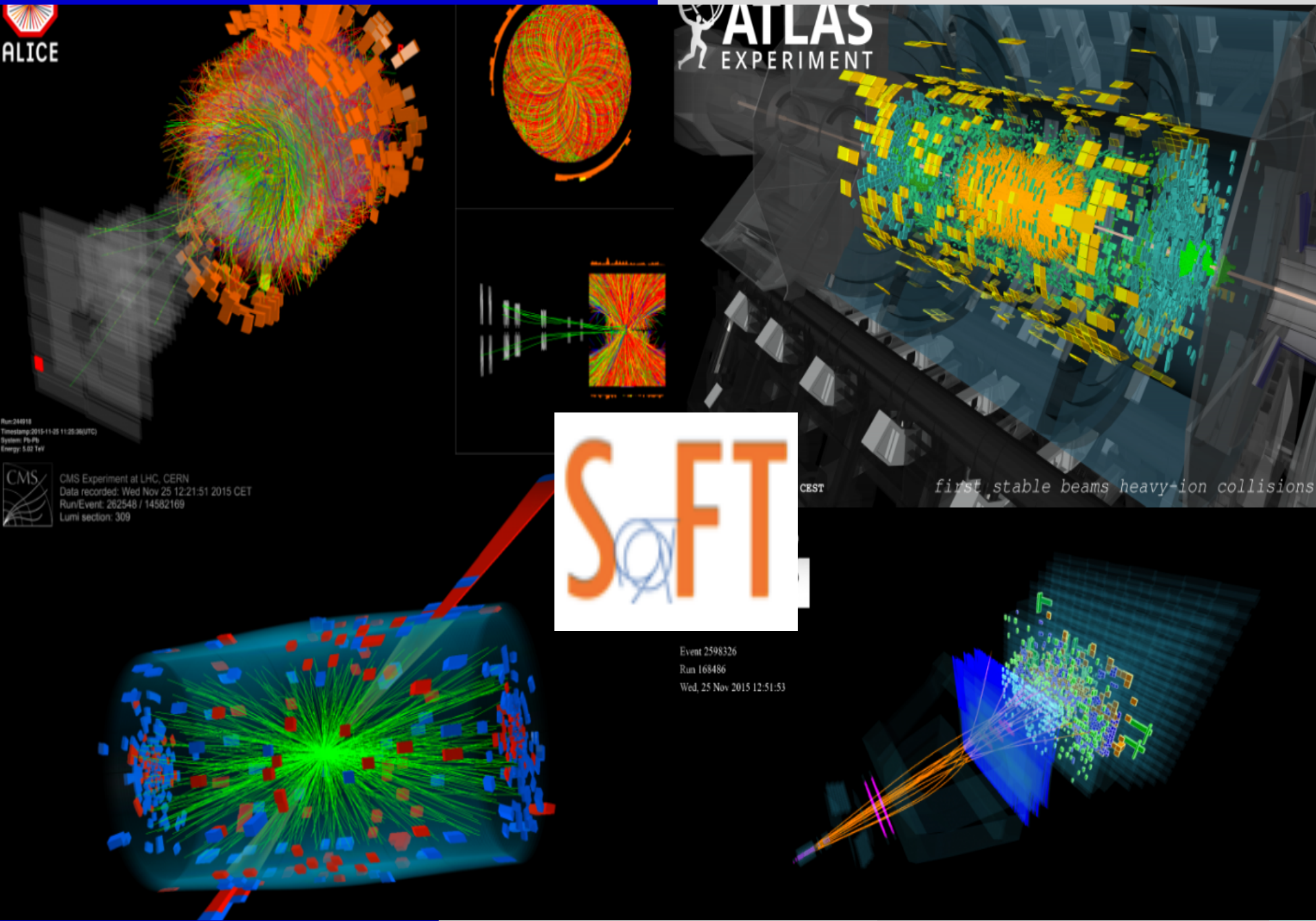
16:30 → 16:50 **The Unsupervised Collider Searches DarkMachines Project** — 20m

Speaker: Amir Farbin (University of Texas at Arlington (US))

16:55 → 17:15 **Searching for New Physics with Deep Autoencoders** — 20m

https://arxiv.org/abs/1808.08992

Speaker: David Shih (Rutgers University)


ALICE
ATLAS
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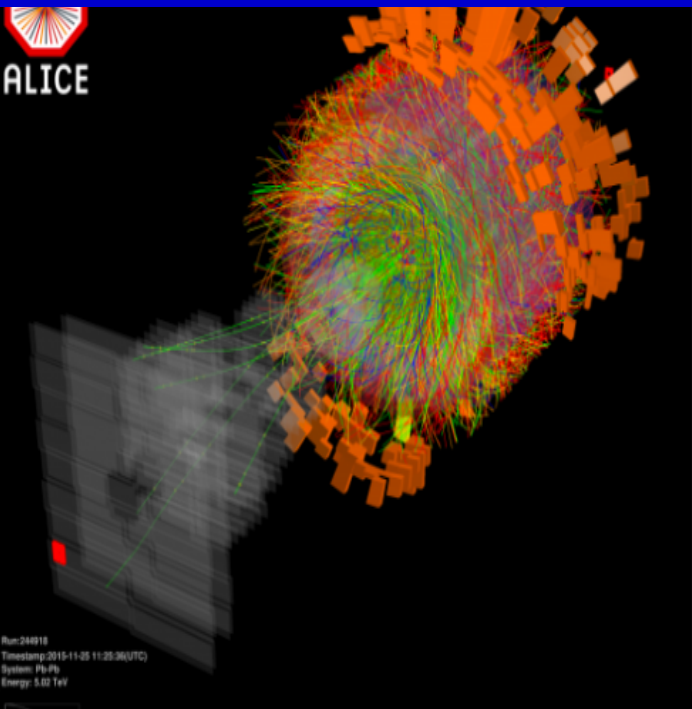
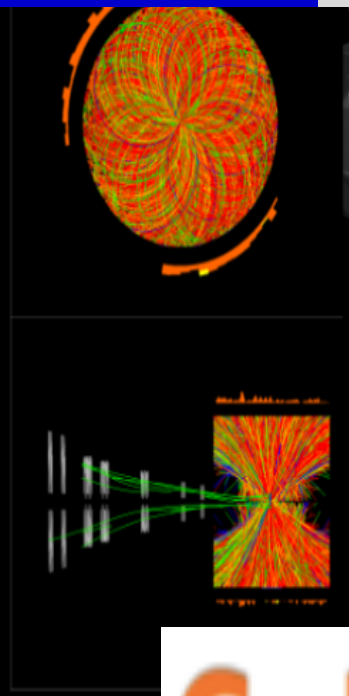
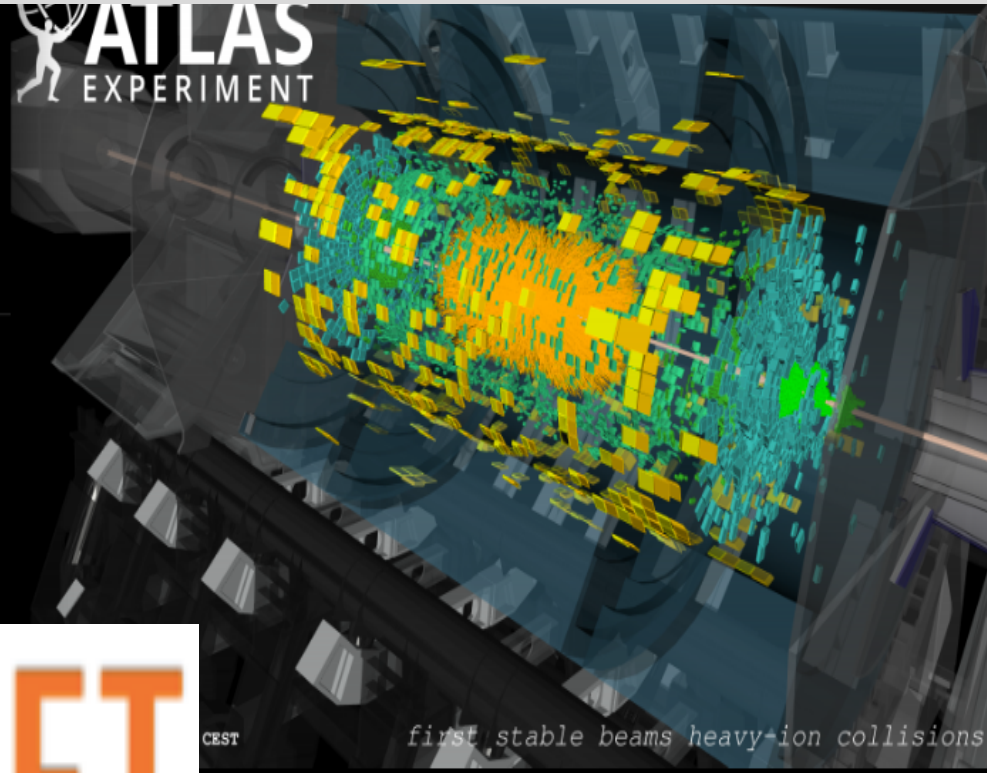
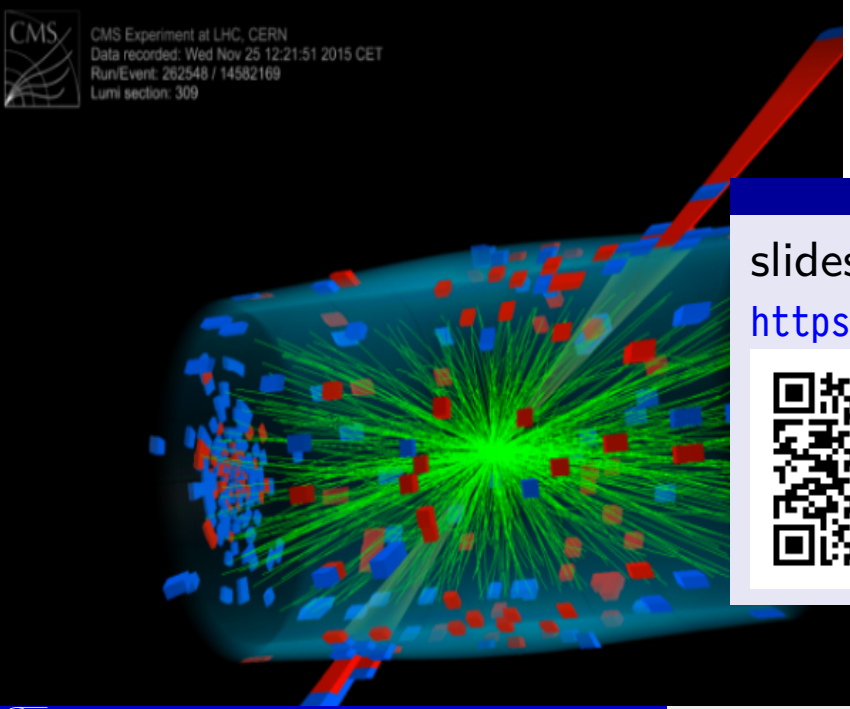
Lumi section: 309
first stable beams heavy-ion collisions
SoFT
Event 2598326
Run 168486
Wed, 25 Nov 2015 12:51:53









SoFT

slides (excl. cern logo) will appear on
https://gitlab.cern.ch/pseyfert/slides-imlnews-2018-10-30