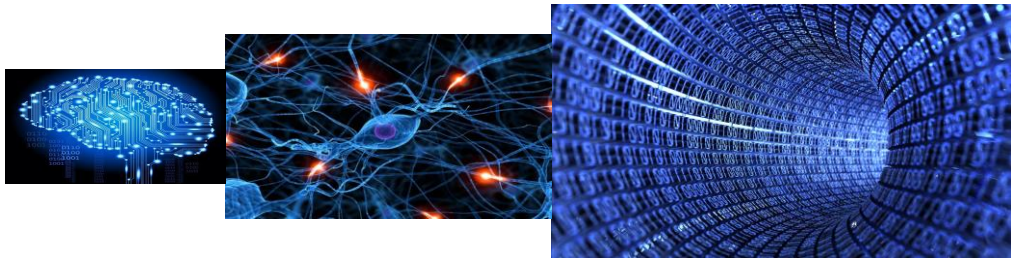
Machine Learning CWP



CWP Workshop Annecy

June 30, 2017

Monday vs. Friday

• 32 pages	20 pages
• 80% bullets	90% text
• Draft Document	Draft Document

- Monday: key ideas in place
  - Expect first draft by end of workshop

Year 1

- **Benchmark Datasets**
  - **For collaboration with ML community, challenges, model benchmarking**

- **Interfaces to external ML Tools**
  - **Existing:**
    - **R, scikit-learn, Keras**
  - **In-progress:**
    - **OpenML, Tensorflow**

Year 1 Applications

- **Object identification**
  - **Various deep learning methods on low-level data**
- **Computer vision techniques**
  - **New applications**
- **Resource Optimization**

Year 3

- **Middleware solutions**
  - **Convert from HEP to ML formats for various tools**
  - **Evaluate formats**
- **Machine learning as a service**
  - **with adequate hardware resources**

Year 3 Applications

- End-to-end reconstruction with deep learning
  - Use in physics analysis
- Monitoring Detector Anomalies
  - Anomaly detection, unsupervised learning
- Simulation
  - GANs, Multi-objective Regression
- Tracking
- Sustainable Matrix Element Methods

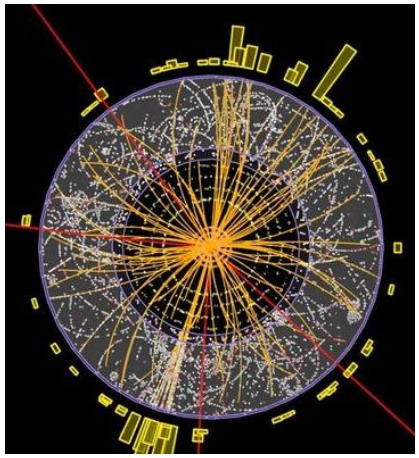
Year 5 Applications

- **Calibration and alignment**
  - **To maximize physics**
- **Triggering and Real-time Applications**
  - **Sophisticated algorithms at all trigger levels**

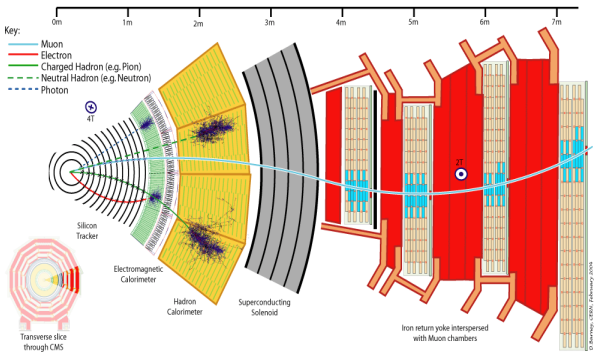
Thank You!

- **Everyone who participated in the workshop and put in a tremendous editing effort in this document**

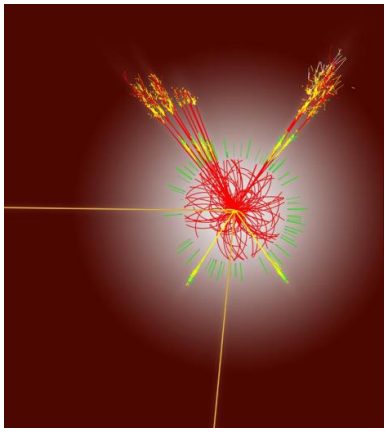
Interesting areas



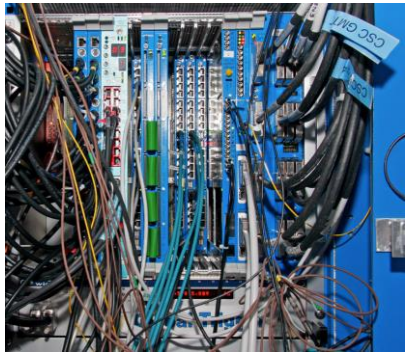
Particle Tracking



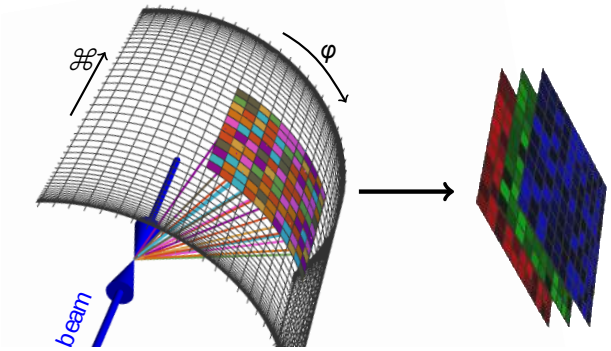
Fast Simulation



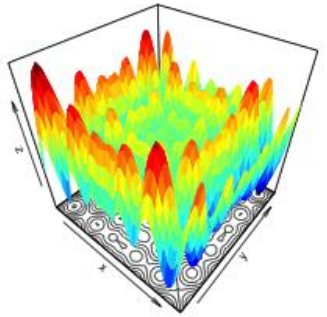
Object Identification



Trigger



Imaging Calorimetry



Simulation