Developments in International Masterclasses

APS Division of Particles and Fields
Fermilab, 02 August 2017

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What is a masterclass? “Particle physicist for a day”

• Intro
• Tour
• Analyze authentic HEP data.
• Videoconference

International Masterclasses 2017, 1 March–11 April

• 50 Countries
• 116 Institutes
• 314 Masterclasses
• > 10^4 Students
• Videoconference moderation from CERN, FNAL, TRIUMF
4 LHC Experiments

- ALICE – strange particles and nuclear modification factor
- ATLAS – Z path and W path
- CMS – J/Ψ path (schools) and WZH path (IMC)
- LHCb – displaced vertices

Development of CMS Measurement

- Increased amount of data
- 4-vectors in webgl event display
- Add Drell-Yan in 2018.
- Higgs path in 2019?
Neutrino Masterclasses are New and Developing

• IceCube – Already in use but not yet in IMC
• MINERvA – Ready for IMC 2018
  • Use momentum; uncertainty to probe carbon nucleus
• MicroBooNE – Projected for IMC 2019
  • Argon purity and weak interaction multiplicity
• DUNE – Longer-term development underway
  • Neutrino oscillations and more
World Wide Data Day (W2D2)
- Pilot December 2016, 20 sites
- Simple measurement – dimuon angular distributions
- Measurement and videocon from school – teacher leads
- 24 hours of videocon shifts around the globe
- Continue in 2017 and beyond.
IMC Reaches Out

International Day of Women and Girls in Science (IDWGS)

- Special masterclasses, Fri. 10 Feb. and Sat. 11 Feb. 2017
- ATLAS, CMS, and LHCb measurements
- Female students, female videocon moderators
- ~320 girls in 10 masterclasses
- Successful, repeat in 2018; expect to grow.

Cecire, DPF 2017, 2 August 2017
IMC Collaborates

African School of Fundamental Physics and Applications
Kigali 2017
• 1.5-day teacher workshop, CMS masterclass
• ATLAS masterclass for ASP students
• 3 x 0.5-day high school visits, mini-masterclass
• Addis Ababa – CMS masterclass

Windhoek 2018
• Project similar work
• Longer teacher workshop

Physics without Frontiers (ICTP)
• Masterclasses to developing countries
• Work at university level

Cecire, DPF 2017, 2 August 2017