Work completed: 2022

Higgs@10 workshop for teachers, summer:

- **Facilitated at 11 centers, 1 day each**
- **Prepared data and event display application**

World Wide Data Day (W2D2), Nov. 10:

- **Projected views (R-Phi, RZ) added for custom version of CMS event display (iSpy-w2d2)**
- **CMS – 23 schools from 11 countries (8 U.S. schools)**
- **ATLAS – 17 schools from 7 countries (4 U.S. schools)**

International Masterclasses:

- **CMS – 22 institutes (4 U.S.) connected to 10 Fermilab videoconferences**

- **ATLAS – 11 institutes (4 U.S.) connected to 7 Fermilab videoconferences**

- **Additional LHC masterclasses with CERN videoconferences or outside Videocon schedule**

- **CMS Instrument for Masterclass Analysis (CIMA) – glitches appeared but still works well**

- **CMS event display (iSpy-webgl) improvements**

CMS e-Lab: supported, use limited

Stand-alone interactive CMS application: Higgs to 4-lepton events, interactive 3D events and embedded panoramic detector views, 4-lepton invariant mass plot.

CMS e-e, mu-mu events (~1M each) prepared from 2015 open data in csv format for coding and analysis.

Open data releases: first release 2015 CMS p-p Run 2 data (13 TeV), remainder of 2012 CMS p-p Run 1 data, CMS heavy-ion data from 2010 and 2011.

Development of ttbar analysis from CMS 2015 data for masterclass (in parallel to ttbar analysis tutorial for CMS Open Data Workshop).

Support for CMS open data infrastructure.

Work for 2023

New version of iSpy-webgl. (using improvements from 2022 such as R-Phi & R-Z views, improved interactivity, …)

Extract remaining Higgs candidate events from 2012 CMS data.

Explore development of ttbar analysis for masterclasses and other educational contexts.

Continue support of CMS open data efforts.

Update CMS masterclass:

- **Connect to recent discoveries. (e.g. W mass anomaly)**
- **Study data analysis tool (e.g. pilot Google sheets).**
- **Experiment with a coding component.**
- **Study possible new versions. (e.g. W mass, ttbar)**

Offer new workshop for summer on recent discoveries.

Create better uses for CMS e-Lab, possible workshop.