

## Annual Report 2021

### **SUNY at Buffalo QuarkNet Center** **Mentors: Profs. Ia Iashvili and Avto Kharchilava**

SUNY at Buffalo (UB) has joined QuarkNet in early 2006. Mentors of the group are UB experimental High Energy Physicists (HEP), Profs. Ia Iashvili and Avto Kharchilava. Every year, the group sponsors at least two activities: Summer teacher Workshop at UB, and Spring Masterclass. The latter in recent years takes place in Nichols High school, where our lead teacher, Mr. Larry Hiller, teaches science courses. Second UB lead teacher, Mr. David McClary, teaches at North Tonawanda High School. Both lead teachers have been with the UB QuarkNet center since its inception.

The UB center has organized the most recent CMS Masterclass on February 27<sup>th</sup>, 2021. Four students participated from Nichols High School. Mentors were connected remotely via zoom (for safety reasons during the Covid-19 pandemic). They gave introductory talks on HEP, research at LHC/CMS, and offered detailed instructions on the CMS data analysis using event display and associated tools. All four students along with their teacher, Mr. Hiller, were connected from the Nichols High School. Students individually analyzed  $Z \rightarrow ee/\mu\mu$ ,  $W \rightarrow e\nu/\mu\nu$  event candidates using iSpy event display. Students analyzed different sets of data and compared their findings. At the end of the data analysis session, students combined results to measure relative fraction of Z events compared to W events, ratio of  $W^+$  over  $W^-$ , and to check lepton universality in these events. They have created various kinematic distributions. Students also “discovered” the Higgs boson,  $J/\Psi$  and  $\Upsilon$  resonances. Finally, students shared their findings with other participating QuarkNet center (Williamsburg) through a videoconferencing, and discussed results with a moderator based at Fermilab. One of the UB center teachers, Ms. Jennifer Gazdovich from Kenmore West High School, also attended the Masterclass remotely.

In 2021, due to Covid19 restrictions, we were unable to organize the Summer Workshop at UB.

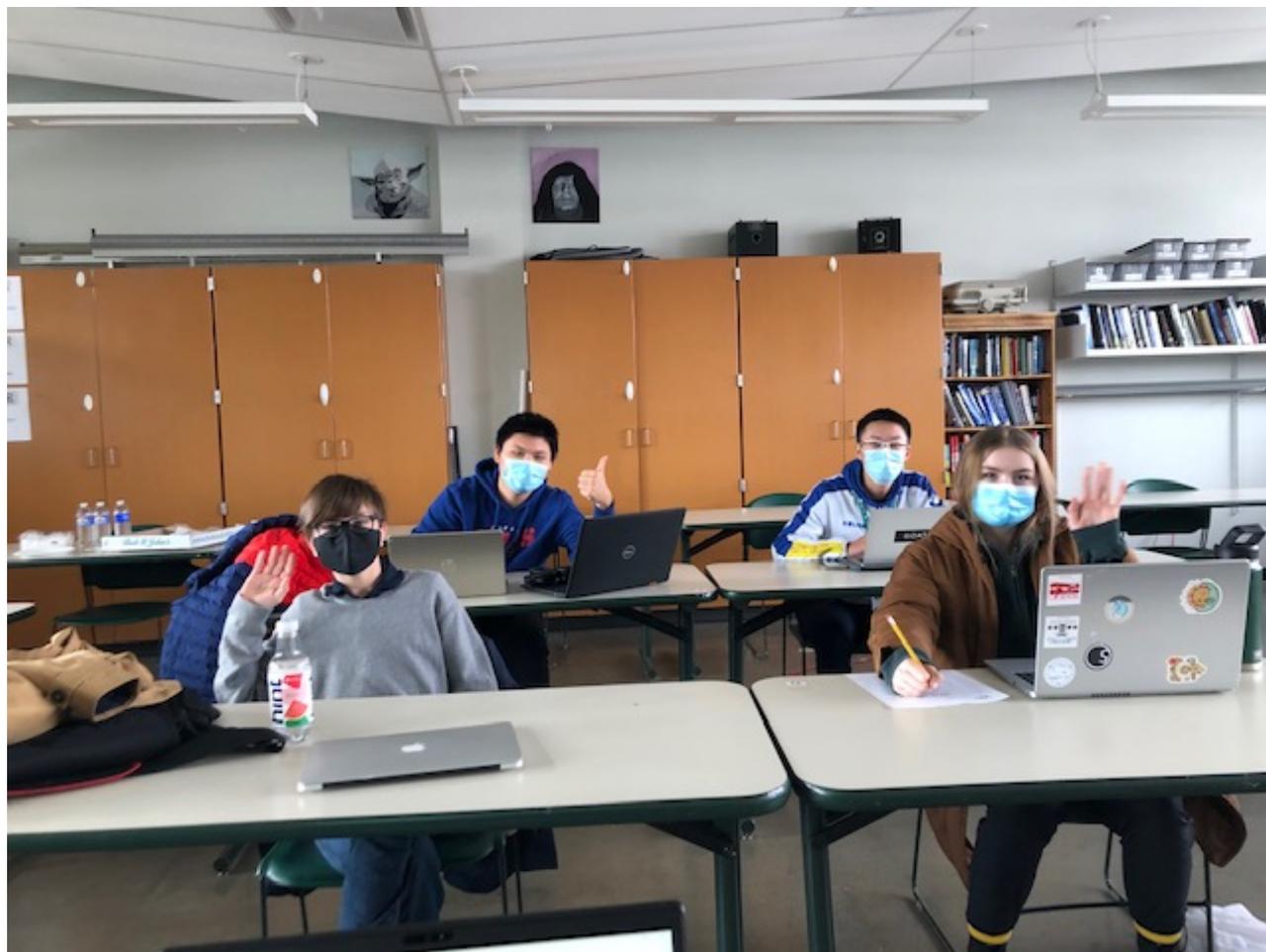


Photo: QuarkNet Masterclass at the UB center, 02/27/2021. Nichols High School students analyzing the CMS/LHC data.

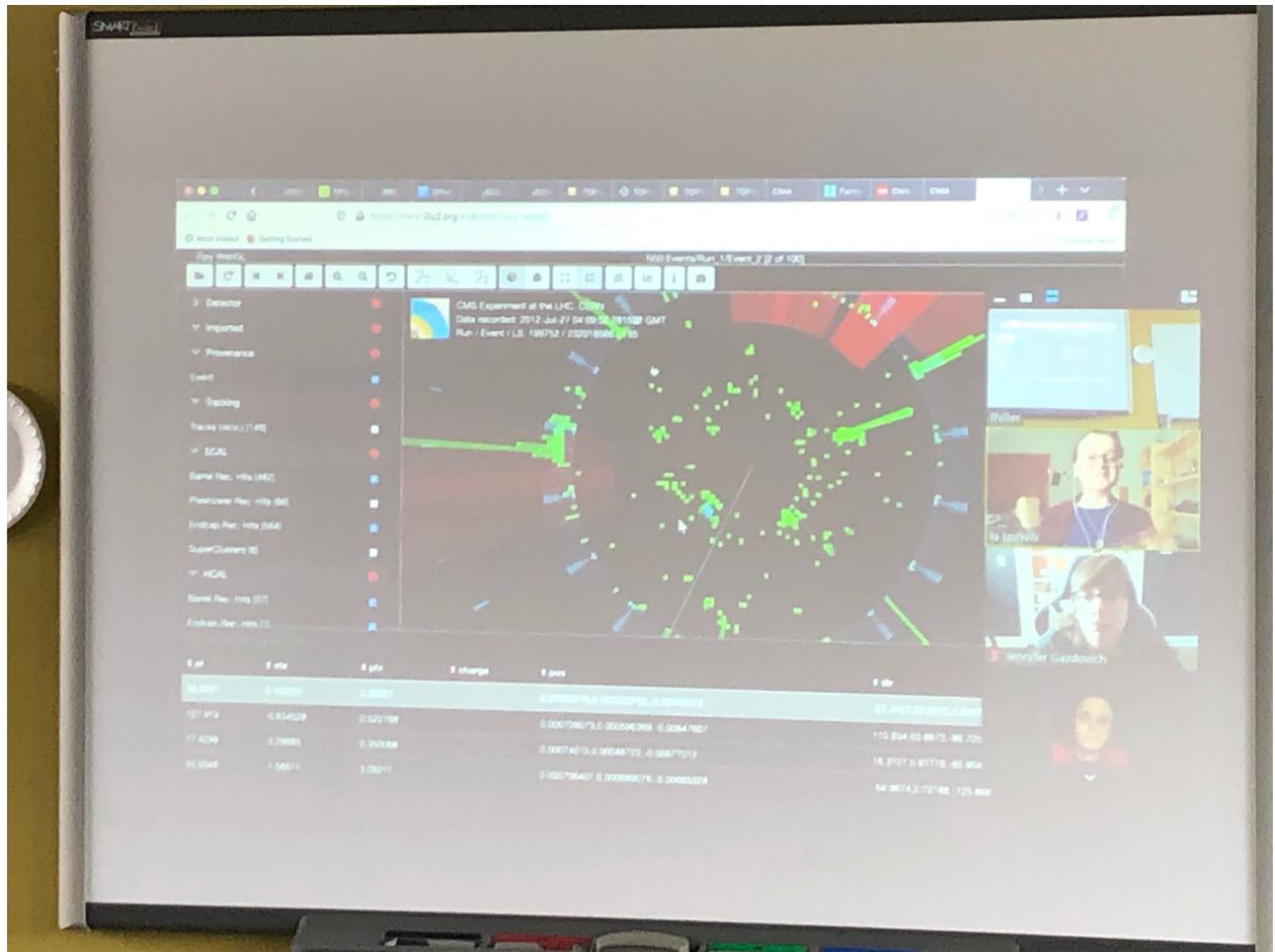


Photo: QuarkNet Masterclass at the UB center, 02/27/2021, with mentors giving instructions remotely.