

## Wayne State University, 12th year in QuarkNet

Mentors: Profs. Gil Paz and Robert Harr

Teachers: Mr. Mike Niedballa, Mr. Vance Nannini

In 2017, the WSU QuarkNet center ran a summer research program, and continued to build a relationship with the Detroit Metro Area Physics Teachers (DMAPT). Harr and Paz have also been regular attendees at DMAPT meetings and often give presentations on various physics topics. A big change this year was enlarging the number of student participating from 12 to 18. This became possible after the third cosmic ray detector was fixed earlier this year.

The High School Student Summer Research Program ran over 6 weeks from July 3 to August 11, 2017. The program was organized as 3 sessions, each lasting for 2 weeks and with 6 students. This enables us to select 18 students from a wide range of backgrounds for the program. We had 97 applicants for these 18 positions. The sessions were organized around projects with Cosmic Ray Detectors (CRDs). About half the day was spent working with the CRDs and the other half was spent learning the basics of particle physics, how to perform an analysis, and how to work with e-lab. Presentations by Wayne State faculty introduced the students to research in general, and particle physics in particular.

At the end of the first week, the students presented a research proposal before the lead teacher, mentors, and other WSU faculty. The teacher and faculty would probe the students plan, aiming to help them focus their work and improve their plans. The students had interesting ideas and the faculty enjoyed working with them on their ideas.



Figure 1: Session 2 students together with lead teacher Mike Niedballa.

At the end of each 2-week session, the students gave a presentation of what they had learned and the results of their experiment. The lead teacher, mentors, and WSU

faculty provided feedback on the presentation and the experimental results. The student presentations and other material from the sessions are on e-lab under lead teacher Mike Niedballa's name.



Figure 2: QuarkNet students “in action”. They are using the telescope built by Mike Niedballa that allows to change the angle of the cosmic ray detectors.



Figure 3: Session 3 students.