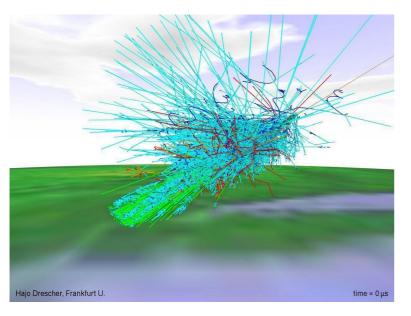


QuarkNet 2022 - Vanderbilt University 20-24 June 2022











QuarkNet 2022 - Vanderbilt University 20-24 June 2022

In-person meeting, Vanderbilt Physics Stevenson Center SC6322. Will try to run a Zoom for the meeting also, but likely up and down, here. VU **Covid policy** is to mask indoors if within 6 feet---please separate for snacking.

Monday, introductions, news, and talks

Tuesday, cosmic ray muon detectors, speed-of-"light", showers, muon decay (anyone?)

Wednesday, Higgs@10 (with Jeremy Wegner, Ken Cecire)

Thursday, CRMD hardware in detail, scintillators, PMTs, DAQ card, GPS

Friday, implementation plans, survey, finish other data analysis





Administration

- Check-ins around the room.
- Sign the attendance sheet.
- Our Admins will/have sent links to set new folks up as "vendors" for Vanderbilt, all legit and for paying the stipends.
- We have four (five?) working sets of cosmic ray muon detectors (CRMDs) and have laptops for datataking and control.
- We use the "standard" Java program *Equip* to control the boards/detectors. Though simpler programs are possible.
- Registration and Survey for QuarkNet Central, links on the must-do-items page. Time for Survey Friday.
- This years and prevous talks and data sets at GitHub Vanderbilt-QuarkNet Workshops





Lunch Venues Near Campus

21st Ave Side (the East side):

- Chipotle Mexican Grill
- Subway Sandwich
- Panera Bread
- San Antonio Taco Co.
- Taco Mama-Hillsboro Village
- Double Dogs
- Shokku Ramen
- Hopdoddy

West End Side (the West side):

- Jason's Deli
- Jersey Mike's Subs
- Oscar's Taco
- Martin's Bar-B-Que
- Wendy's
- Newk's Eatery
- Bombay Palace
- Taziki's Mediterranean Cafe

And Many More...



Monday Schedule

News and Talks

8:30-9:00am Bill Gabella, administration and news

9:00-10:00am Will Johns, Update from CERN (Zoom)

10:00-10:10am Break

10:10-11:10am Vicki Greene, Flow and jet quenching in high-energy heavy ion collisions (Zoom)

11:10-12:10am Bill Gabella, LIGO and Gravitational Waves

12:10-1:30pm Lunch

1:30-2:30pm Kelly Holley-Bockelmann, Black Holes, Gravitational Waves

2:40-3:40pm Sara Frederick, Quasar Spectroscopy with SDSS

Think about the use of the weeks material for use in the classroom, see the Guide to Teacher Implementation Plan Development. We will discuss and brainstorm these Friday.





Tuesday Schedule

Cosmic Ray Muon Detectors (CRMDs), their use

9:00-10:00am Bill Gabella, Cosmic Rays, Muons, and QuarkNet CRMDs

10:00-10:10am Break

10:10am-12:00pm Discuss experiments from the manual, set them up: some subset of flux on telescope (vertical, east-west, north-south), shower setup, muon decay setup.

12:00-1:15pm Lunch

1:15-2:20pm Data analysis

2:20pm-2:30pm Break

2:30-3:30pm More data analysis, eLab and non-eLab





Wednesday Schedule

Higgs@10 --- 10 years since the announcement of the Higgs particle discovery, 4 July 2012

Led by Jeremy Wegner.

Link: (original, might change) https://quarknet.org/content/higgs10-workshop

9:00-Start Time

12:00-1:15pm Lunch

1:30pm-3:30pm Tentative Finish time

Other links of interest, **Higgs@10**...

Rice Workshop, 6-10 June 2022 and https://quarknet.org/content/2022-cosmic-neutrino-data-higgs10-workshop-ksu.

Last years Google Colab, Vanderbilt Coding agenda here.



Thursday Schedule

Hardware Day, Bill, Nick, Jeremy

9:00am-10:00am Bill Gabella, some details on the hardware, follow the signal...

12:00-1:15pm Lunch

1:30-3:30pm Analyze the PMT signals, compare with muon spectra, Green's photon counting, experiment with ideas

Exerpts from Dan Green's **The Physics of Particle Detectors**, Cambridge University Press, 2000:

Chapter 2 – The photoelectric effect, photomultipliers, scintillators is here.

Appendix J – Statistics introduction, Appendix K – Monte Carlo models are here.





Friday Schedule

Last Day, implementation plans, survey, miscellaneous

9:00-12:00pm Implementation plans, discuss and brainstorm as a group; do the survey (surveymonkey.com)

12:00-1:30pm Lunch

1:30-3:30pm all other business





News

We miss you, Med!

Med Webster, long-time professor at Vanderbilt University in Physics and Astronomy passed away this year. We was the second mentor at Vanderbilt, after Bob Panvini.

He will be missed.





Useful Links for This Workshop

- CRMD User Manual https://github.com/gabella/VandyQuarkNet/tree/master/manuals
- Vanderbilt QuarkNet "Drupal" group page: http://quarknet.i2u2.org/group/vanderbilt-university-quarknet-center





Useful Links

- Vanderbilt QuarkNet Site, GitHub: https://github.com/gabella/VandyQuarkNet
- Vanderbilt QuarkNet Site, older web pages: http://www.hep.vanderbilt.edu/~gabellwe/qnweb/
- Vanderbilt QuarkNet "Drupal" group page: http://quarknet.i2u2.org/group/vanderbilt-university-quarknet-center
- Vanderbilt QuarkNet Workshop 2021 page: https://github.com/gabella/VandyQuarkNet/tree/master/quarknet2021
- QuarkNet Cosmic Ray eLab Teacher page: http://www.i2u2.org/elab/cosmic/teacher/
- QuarkNet CMS eLab page: http://www.i2u2.org/elab/cms/home/project.jsp