

Friday Flyer - December 13, 2019



Submitted by kcecire on Thu, 12/12/2019 - 17:18

Friday Flyer/News (/content/friday-flyernews)

This is the last Friday Flyer of 2019. We will resume on January 3, 2020. Happy Holidays!



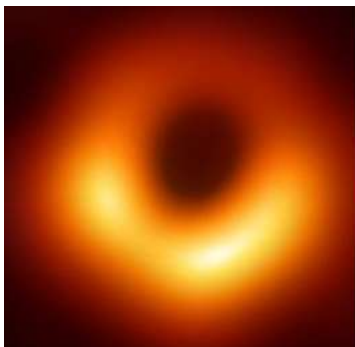
Spotlight on 2019

A lot happened in physics in 2019. Our astrophysics friends took the world by storm by **capturing an image of a black hole** (<https://www.jpl.nasa.gov/edu/news/2019/4/19/how-scientists-captured-the-first-image-of-a-black-hole/>) through clever use of gravitational lensing. The **Nobel Prize in Physics went astro** (<https://www.nobelprize.org/prizes/physics/2019/popular-information/>) as well, with awards to James Peebles for his theoretical framework of cosmology and to Michel Mayor and Didier Queloz for their work on exoplanets. At the LHC, 2019

was the first year of the long shutdown (**slides!**

https://indico.cern.ch/event/702149/contributions/2879714/attachments/1595391/2526647/LS2_Project_introduced_to_ILOs_v2018.0.pdf) to enable upgrades of the detectors and increase luminosity even further. What have we forgotten? Probably a lot, so here is the rundown of **science news for 2019** (https://en.wikipedia.org/wiki/2019_in_science) from *Wikipedia*.

It was a good year for QuarkNet as well. It was exciting to see that the only undergraduate listed as a collaborator on the Event Horizon Telescope that imaged that black hole, Joe Farah, started with QuarkNet as a student of fellow Mike Wadness, working on cosmic rays and masterclasses. Yes, we are still excited! (Check out our **April 12 edition** (<https://quarknet.org/content/friday-flyer-april-12-2019>) for more.) Fermilab, the University of Rochester, and QuarkNet introduced the **MINERvA Neutrino Masterclass** (<https://indico.fnal.gov/event/22340/>) to International Masterclasses, the first-ever neutrino masterclass for IMC. It went very well and we are coming back for more in IMC 2020. Our UIC center made a study of the cosmic ray flux in the MINOS cavern at Fermilab in their Muon Underground Neutrino Experiment (MUSE) and reported on it and on the Eclipse project to the International Cosmic Ray Conference in Madison, Wisconsin last summer. Finally, this was the first full year of our new grant and everyone had to make adjustments. Our QuarkNet centers really stepped up to the plate with flexibility and creativity. Being on the QuarkNet staff is an honor because of the people we are privileged to work with, from QuarkNet teachers and their students to our amazing mentors. Thanks.



Views of 2019 (left to right): That black hole in M87, CMS during shutdown, and students moving detectors for MUSE.



News from QuarkNet Central

Registration for International Masterclasses continues! The CERN Doodle polls are closed. We are holding the Fermilab polls open a few more days to Wednesday, December 18. Go to the **CMS Doodle** (<https://doodle.com/poll/q3mg7dwtwdgewm5y>), the **ATLAS Doodle** (<https://doodle.com/poll/cnpr3qr8mdrzqw2i>), or the **MINERvA Doodle** (<https://doodle.com/poll/pauyykm489whkw63>) for Fermilab videoconferences. There is a new **International Masterclasses Circular** (</sites/default/files/Circular6-20191213.pdf>) out today as well. Once polls close,

registration is accomplished via e-mail. Contact Ken for more information.

CERN summer programs are on the way; the special QuarkNet application will open on January 3, 2020, and we will hold it open for three weeks. If you've already applied directly to CERN, great. Every QuarkNet teacher who would like to spend two weeks at CERN should go to the CERN **International Teacher Programmes page** (<https://teacher-programmes.web.cern.ch/international-teacher-programmes>) and

follow the links to the High School Teachers (HST) program or to International Teacher Weeks (ITW). HST and ITW are pretty much identical but take place at different times of the summer. QuarkNet teachers should also apply via QuarkNet. We have eight spaces reserved just for QuarkNet teachers this year—more than ever. This maximizes your chance to find a pathway to CERN in Summer 2020!

AAPT is offering a course with three graduate credits starting next month and a workshop this summer in computational modeling. **Check it out** (<https://www.aapt.org/K12/Computational-Modeling-in-Physics-First.cfm>).

LIGO is offering a summer program for teachers at Hanford. **Learn more** (<https://www.ligo.caltech.edu/WA/page/lho-ipa-pd>).

Beamline for Schools (BL4S) proposals are due March 31, 2020; learn more at the **BL4S website** (<https://cern.ch/bl4s>).

One more item: Herman White retires from Fermilab at the end of this month. Herman has been a great friend to QuarkNet, having served for many years on our Advisory Board and taken time in countless ways to explain some physics or encourage our work. He was a guide and inspiration to QuarkNet teachers and students at the USA Science and Engineering Festival and to the public as well. Herman is the sort of fellow who will stop his busy schedule to explain some particle physics to a passing young person. We wish him all the very best. You can **read more** (https://news.fnal.gov/2019/12/herman-white-retires/?utm_source=newsletter&utm_medium=email&utm_campaign=ft-191210) in *Fermilab Today*.



Physics Experiment Roundup

We learn in *symmetry* that LHC can probe things we do not expect, like the **work in ALICE to understand neutron stars** (<https://www.symmetrymagazine.org/article/neutron-star-particles-go-under-the-lhc-microscope>). Meanwhile, physicists in Hungary may have **discovered a new particle** (<https://phys.org/news/2019-12-x17-factor-particle-physics-dark.html>) way outside LHC in a small experiment, according to *PhysOrg*. And in *APS Physics*, we find that scientists are at work on **getting the most out of gravitational-wave detectors** ([https://physics.aps.org/articles/v12/139?](https://physics.aps.org/articles/v12/139?utm_source=newsletter&utm_medium=email&utm_campaign=ft-191210)

[utm_source=newsletter&utm_medium=email&utm_campaign=ft-191210](https://physics.aps.org/articles/v12/139?utm_source=newsletter&utm_medium=email&utm_campaign=ft-191210) in *Fermilab Today*.



Resources

Well, *symmetry* comes through again with useful reading. Literally, they offer a nice **review of physics books** ([https://www.symmetrymagazine.org/article/physics-books-of-2019?](https://www.symmetrymagazine.org/article/physics-books-of-2019?utm_source=newsletter&utm_medium=email&utm_campaign=ft-191211)

[utm_source=newsletter&utm_medium=email&utm_campaign=ft-191211](https://www.symmetrymagazine.org/article/physics-books-of-2019?utm_source=newsletter&utm_medium=email&utm_campaign=ft-191211)) for 2019. Learn more physics! And they tell us about the **human face(s) of physics** ([https://www.symmetrymagazine.org/article/humans-of-physics?](https://www.symmetrymagazine.org/article/humans-of-physics?utm_source=newsletter&utm_medium=email&utm_campaign=ft-191206)

[utm_source=newsletter&utm_medium=email&utm_campaign=ft-191206](https://www.symmetrymagazine.org/article/humans-of-physics?utm_source=newsletter&utm_medium=email&utm_campaign=ft-191206)), which is always worth knowing more about.



Just for Fun

It's back: the **Physics in Advent** (<https://www.physics-in-advent.org/>) site! Go here for 24 physics experiment videos with Santa Claus! What better way to nerdify the season? One more video: an appreciative student tweeted this video, "**crazy things my Physics Professor did**" (https://twitter.com/its_riccaa). It is actually sort of inspirational. Hat tip to Marge Bardeen.

We at the *Friday Flyer*, the only news source you need aside from the others, wish you wonderful holidays and a great

2020!

QuarkNet Staff:

Mark Adams: adams@fnal.gov (<https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=adams@fnal.gov>)

Ken Cecire: kcecire@nd.edu (<https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=kcecire@nd.edu>)

Shane Wood: swood5@nd.edu (<https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=swood5@nd.edu>)