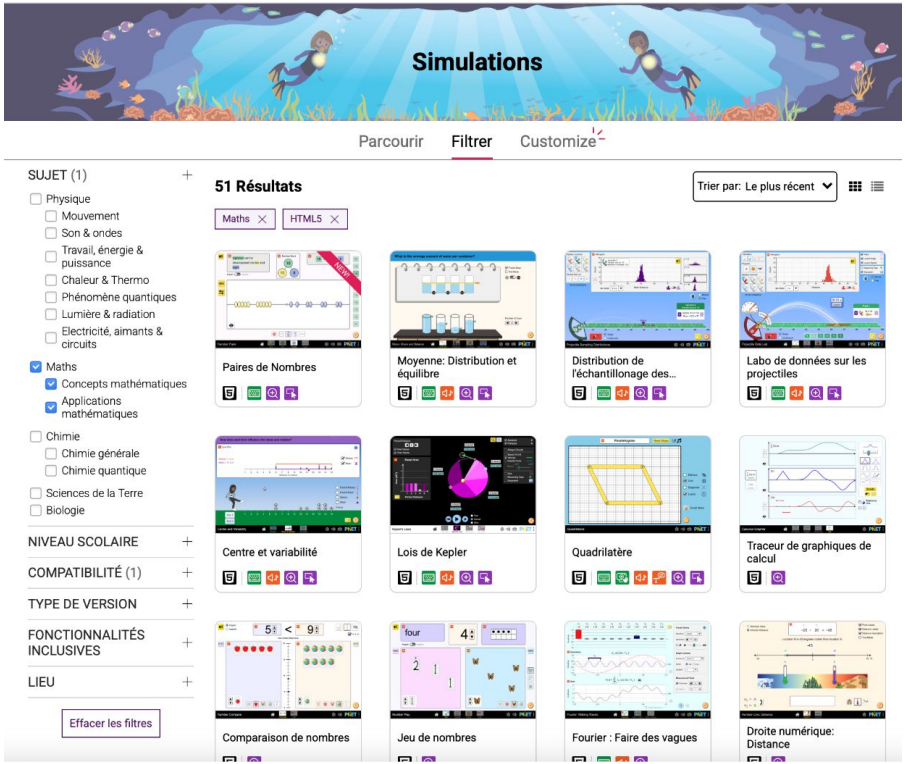
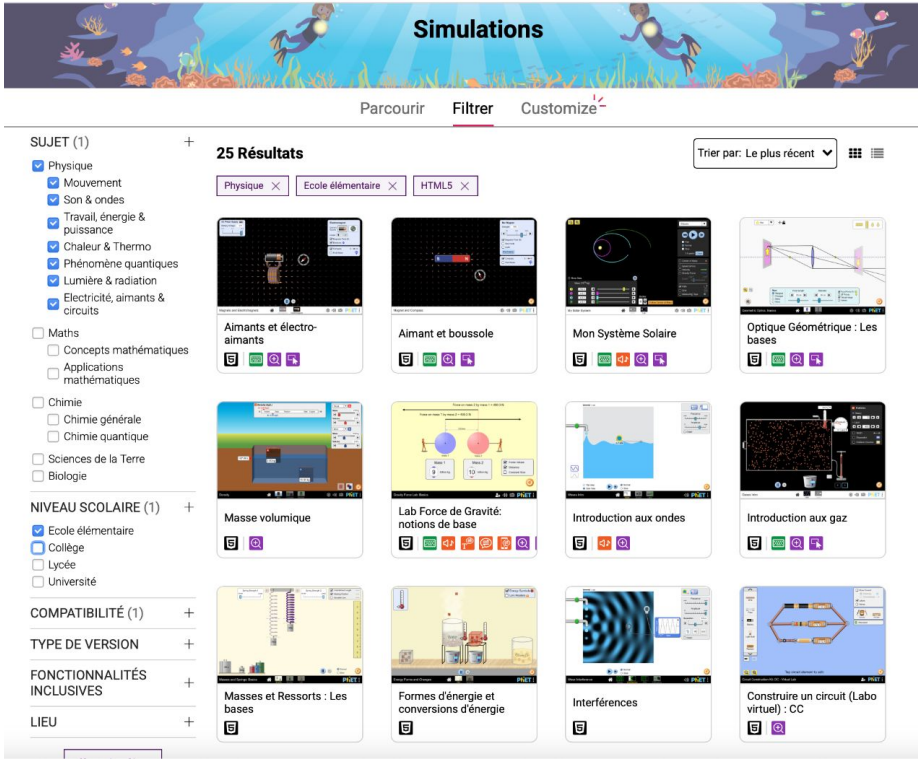
Science News
October 2025

Interactive simulations

https://phet.colorado.edu/fr/

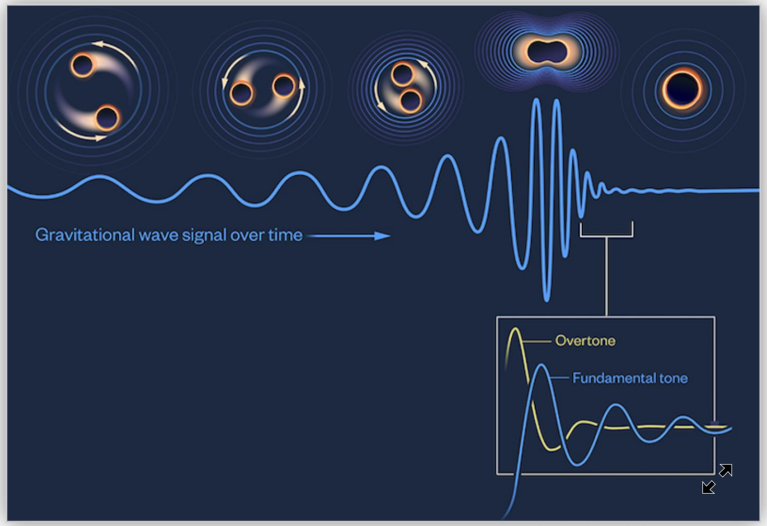




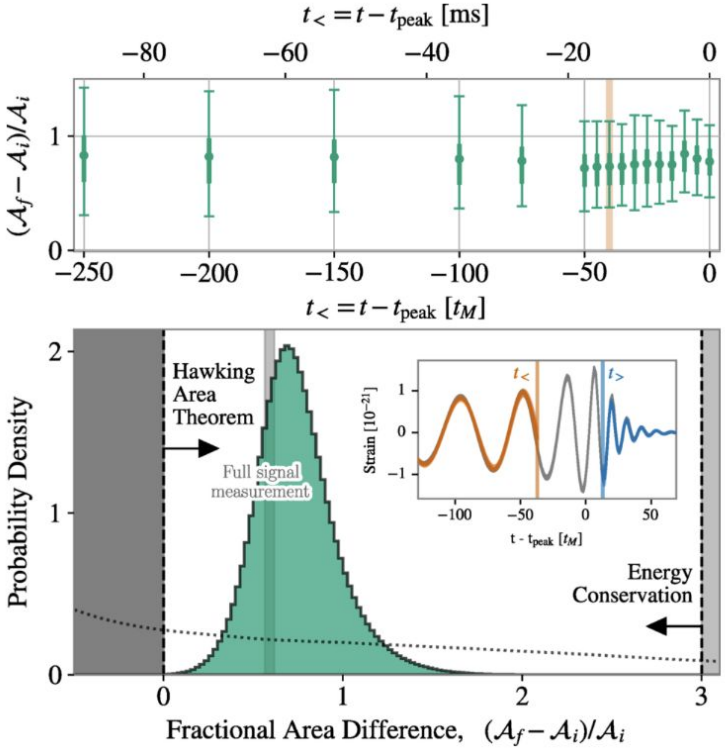
Testing Black hole Hawking's area law

- GW250114 (LIGO): S/N =80 !
- Clearest black hole merger signal ever measured
- The sum of event horizon's area of the new merged black hole is larger than the sum of the areas of the two initial black holes.
- As predicted by Stephen Hawking in 1971 (Phys. Rev. Lett. 26)

https://journals.aps.org/prl/abstract/10.1103/kw5g-d732

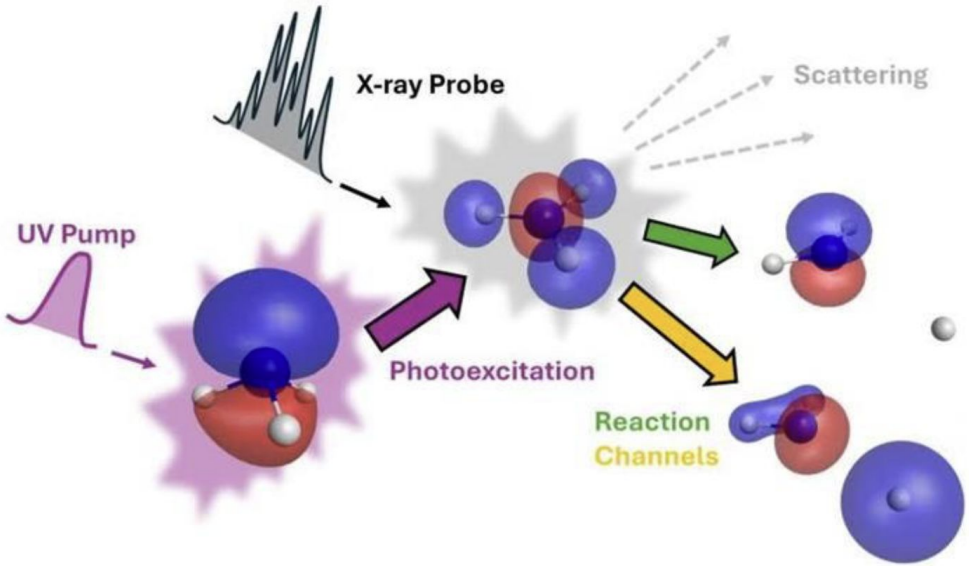


L. Reading-Ikkanda/Simons Foundation



Valence electron in movement seen for the first time

https://journals.aps.org/prl/abstract/10.1103/53h3-vykl

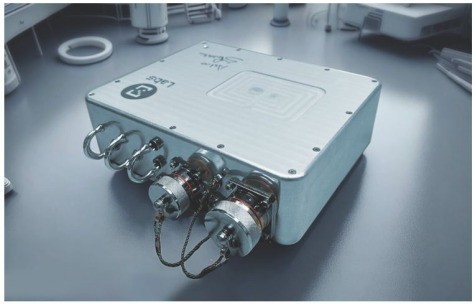


Source: © Ian Gabalski/Stanford/SLAC National Accelerator Laboratory

An ultraviolet pump laser (left) photoexcites an ammonia molecule (blue and red shapes), driving both electronic and nuclear rearrangement (centre). X-rays (top left) probe the evolving electron density, offering a view of the electron motion responsible for driving the reaction (right).

- Measurement made at SLAC, using ultraviolet laser light to trigger individual hydrogen atoms to separate from ammonia molecules -> initiate a chemical reaction
- Then X-ray beams from SLAC's Linac Coherent Light Source (LCLS) used to fire the molecules after an infinitesimally small delay.
- By analyzing the position of scattered photons that hit the detector, and the change of position with time, it is possible to track the movement of key electrons during the reaction

A CERN engineer in the International Spatial Station



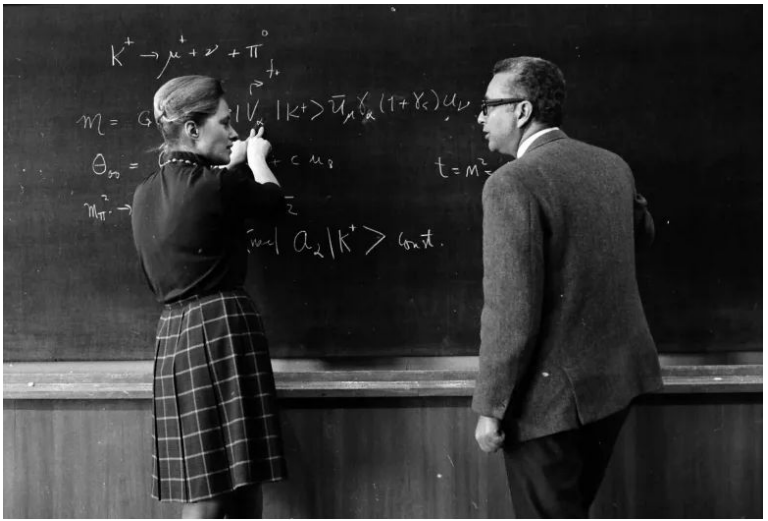
— RadMon-on-ISS technology demonstration for Ignis

https://home.cern/fr/news/news/engineering/lift-cern-engineer-travels-space

Will realise 13 experiments, one of them led by the CERN: Space RadMon (radiation tracking and effects on electronic components)

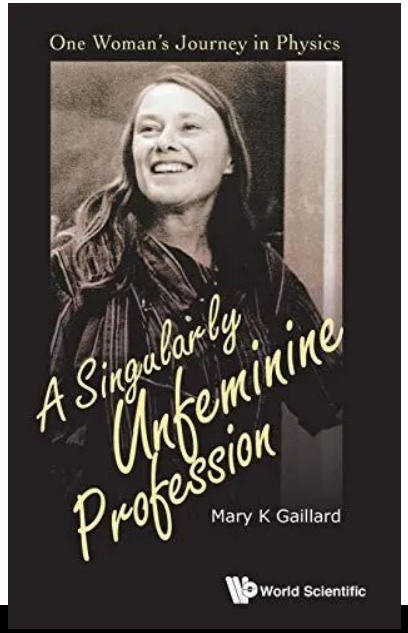
L'équipage de la mission Axiom 4 a décollé avec succès aujourd'hui à 8h31 (CEST) depuis le complexe de lancement 39A du Centre spatial Kennedy de la NASA en Floride. Le vaisseau spatial Dragon de SpaceX, baptisé Grace, est désormais en orbite et devrait s'amarrer à la Station spatiale internationale le 26 juin vers 13 h (CEST), en se connectant au port du module Harmony qui fait face à l'espace. (Image : Axiom Space)

Mary K Gaillard - 1939 - 2025



Several key theoretical contributions to particle physics
Among others:

- 1973: prediction of the charm quark mass a few months prior to its discovery
- prediction of the bottom quark mass but as she said: "we don't really know why the prediction for the bottom quark comes out right !"
- Showed how "jets", created in high-energy accelerators, could be identified as manifestations of the "gluon"
- She later worked on SuperGravity



Mary K Gaillard started her career at CNRS (Orsay) in the sixties

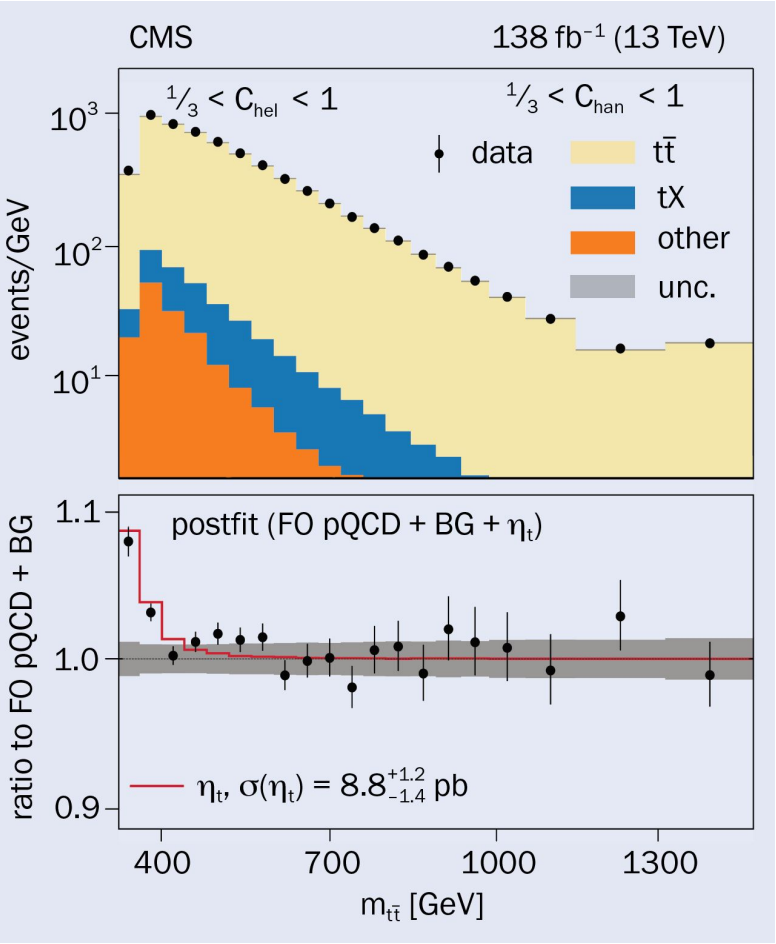
- She worked in the CERN Theory group in parallel
- 1 year visit in Fermilab in 1973 →c quark

She created a theory group at LAPP in 1979, which will later become LAPTh

In 1980, she authored a report on the status of women in science at CERN

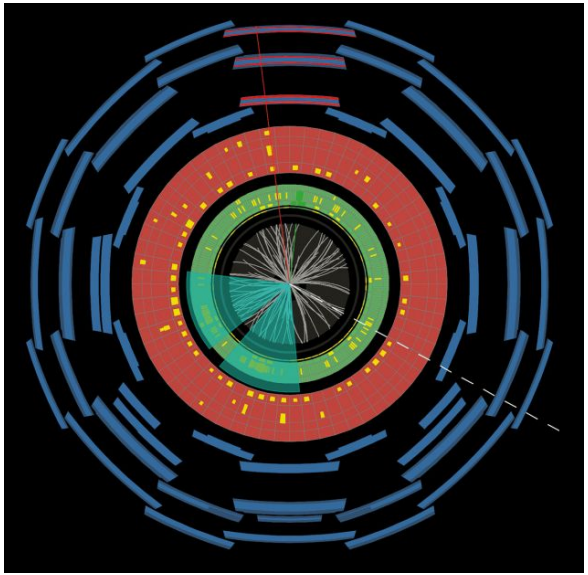
She joined Berkeley in 1981

Observation of top - antitop excess in CMS and ATLAS



The excess close to the top - antitop threshold could be interpreted as a contribution from a (t-tbar) quasi bound state (toponium)

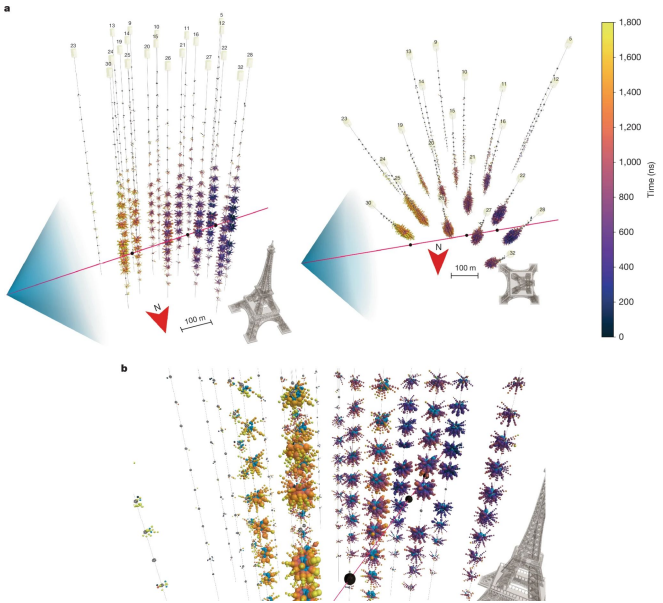
- $\sigma = 8.8 \pm 1.3$ pb



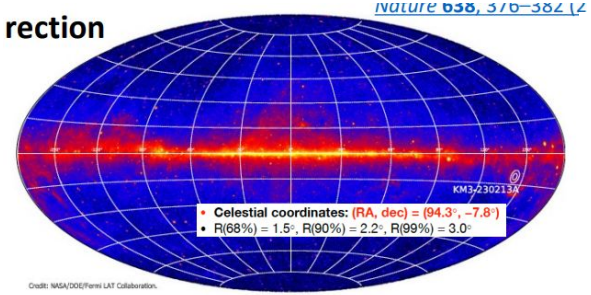
Excess confirmed by ATLAS this summer

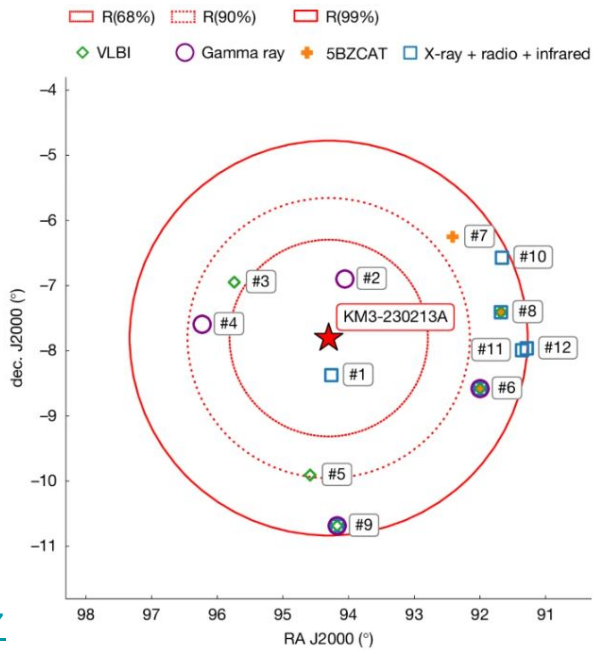
- $\sigma = 9.0 \pm 1.3$ pb

- https://arxiv.org/abs/2503.22382
- https://cms.cern/news/it-takes-two-cms-observes-signs-attraction-between-top-quark-pairs
- https://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/CONFNOTES/ATLAS-CONF-2025-008/



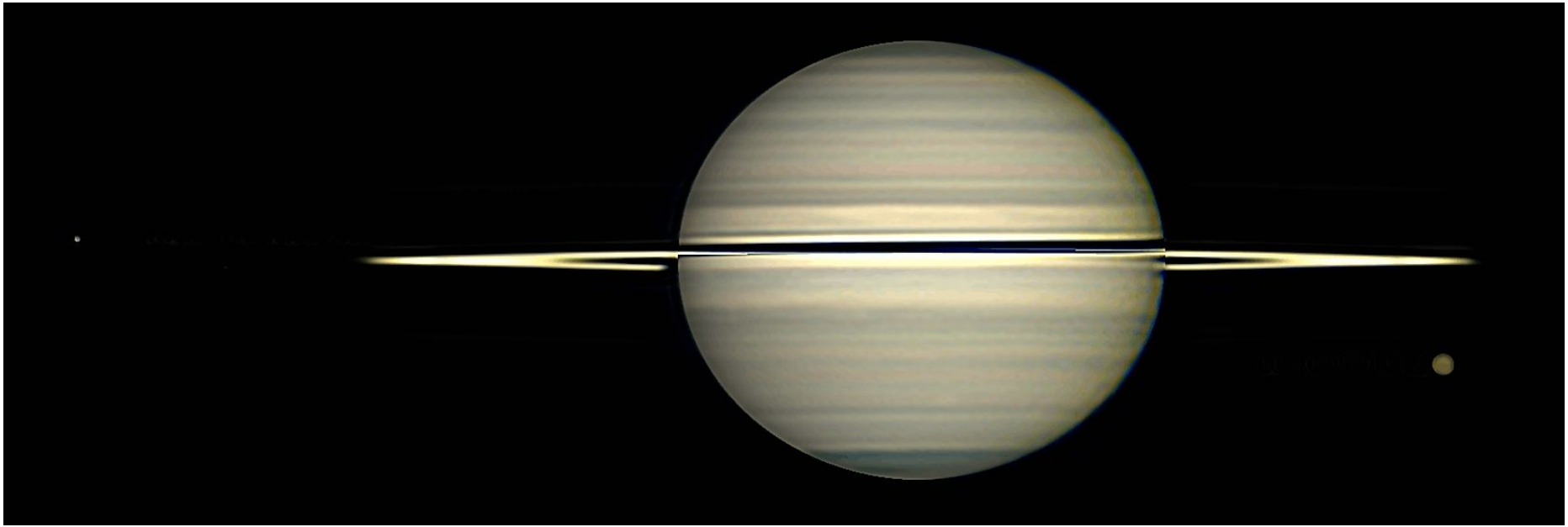
~220$^{+570}_{-110}$ PeV neutrino detected in KM3Net / ARCA - Most energetic neutrino ever observed





No obvious associated source but they are refining the measurement of the detectors' position

https://indico.cern.ch/event/1528564/contributions/6642683/attachments/3126664/5545876/Talk_NuFact2025_KM3NeT_PauldeJong.pdf



Saturn with Titan and Tethys by Simon Labergère 2-hour rotation with a 400 mm diameter telescope