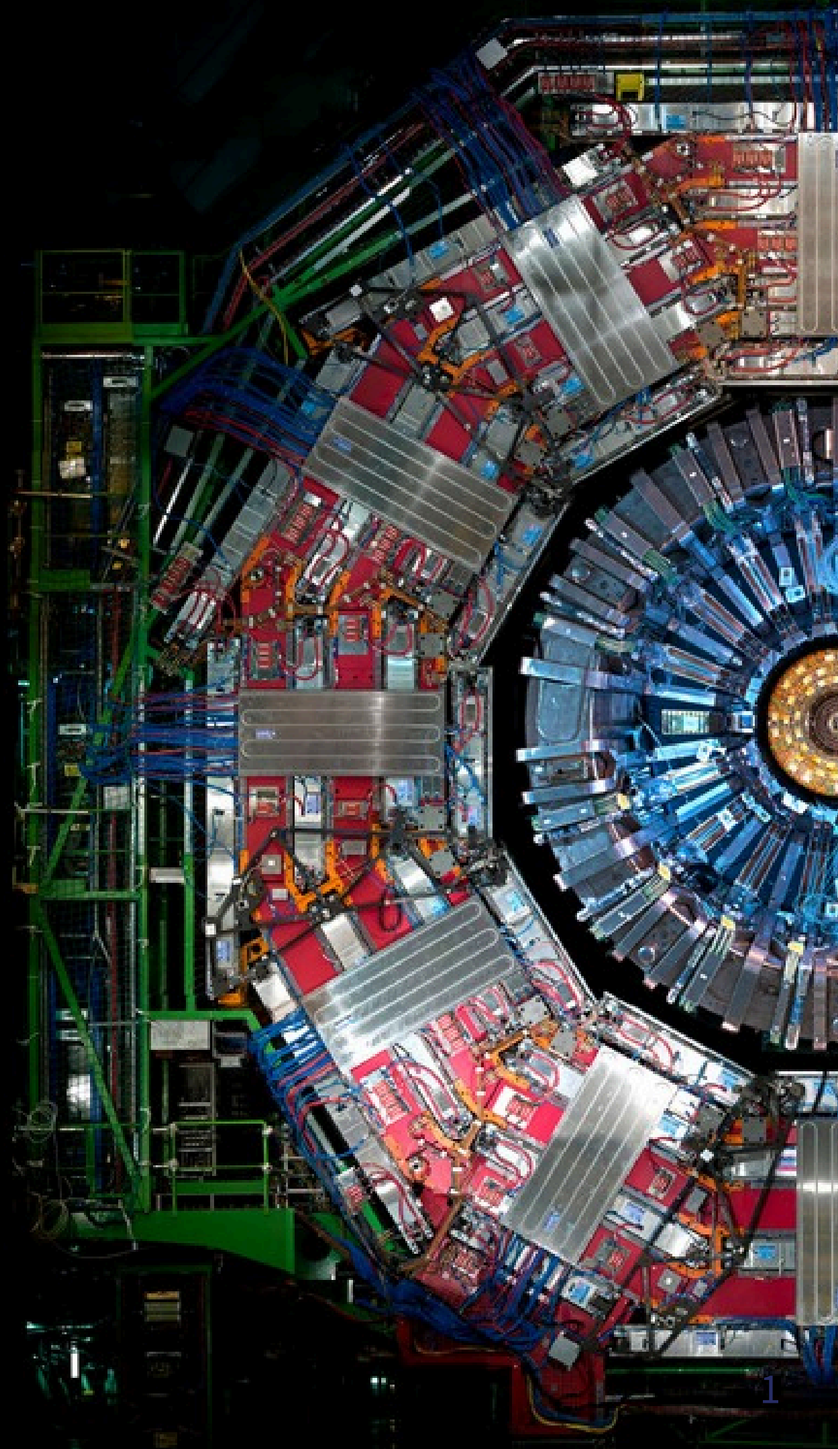
Communicating Science: how the CMS Experiment at CERN uses dialogue and humanisation to engage its audiences in HEP, and how you can too!

Sofia Hurst, CMS Experiment, CERN

sofia.hurst@cern.ch



SCAN ME





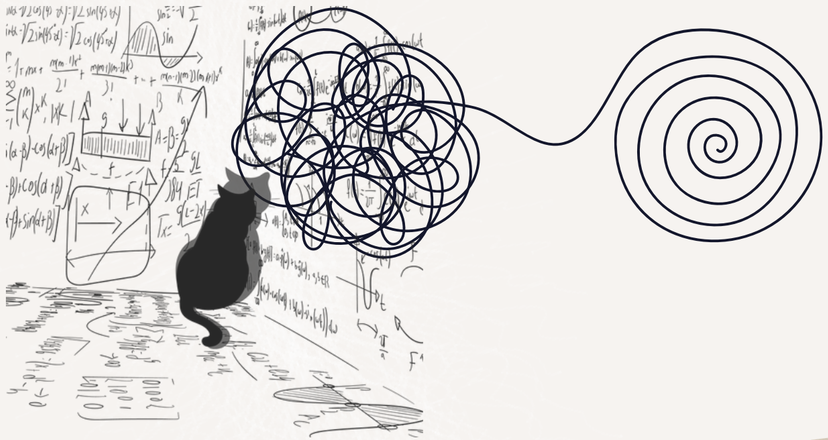



STAFF




GALAXY DANCE

How did I get there?



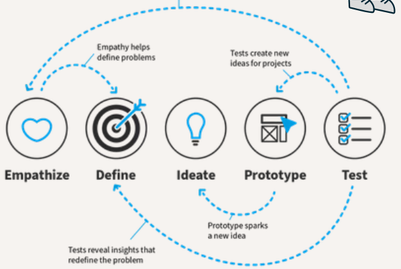












Imperial College London

I,SCIENCE
READ. WATCH. LISTEN.







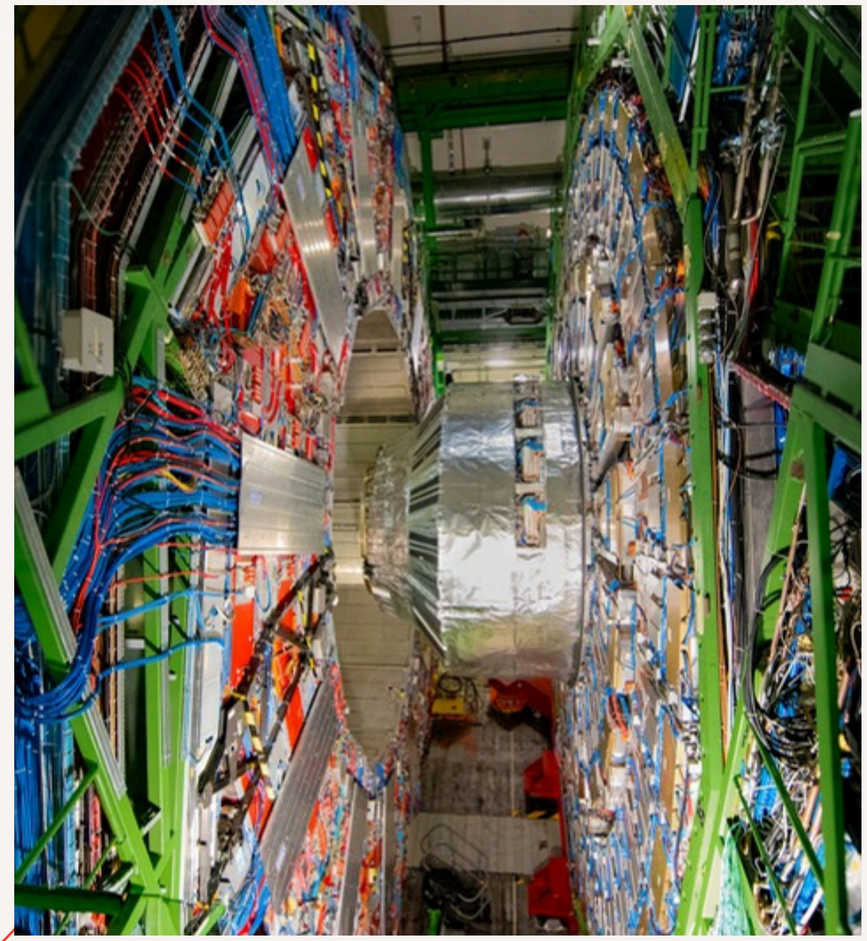


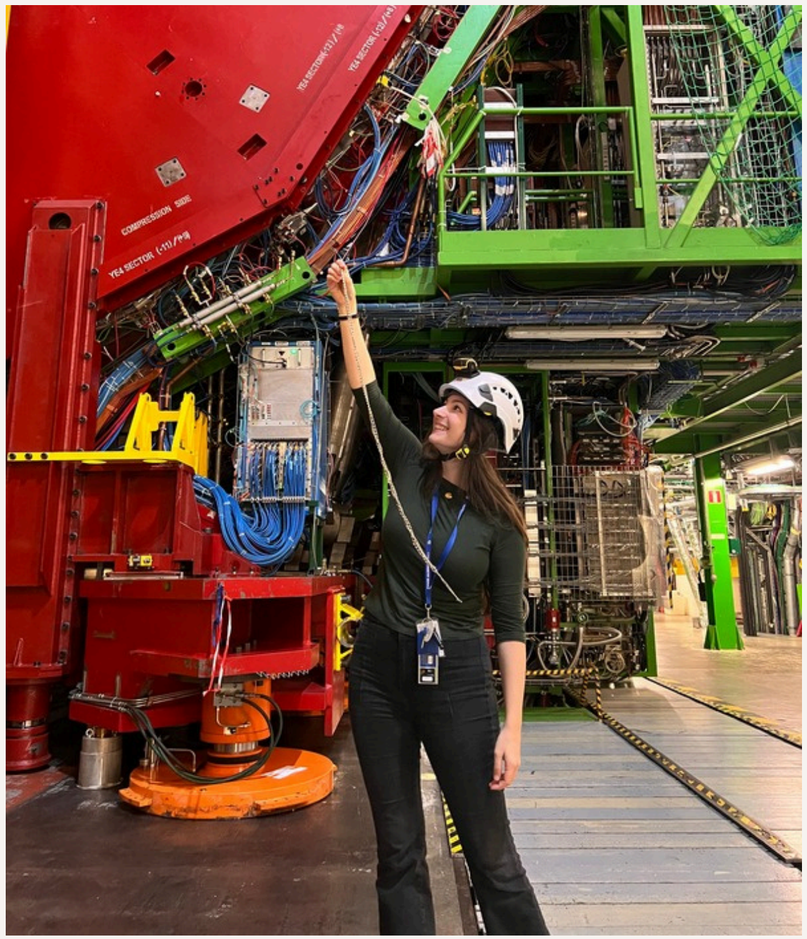


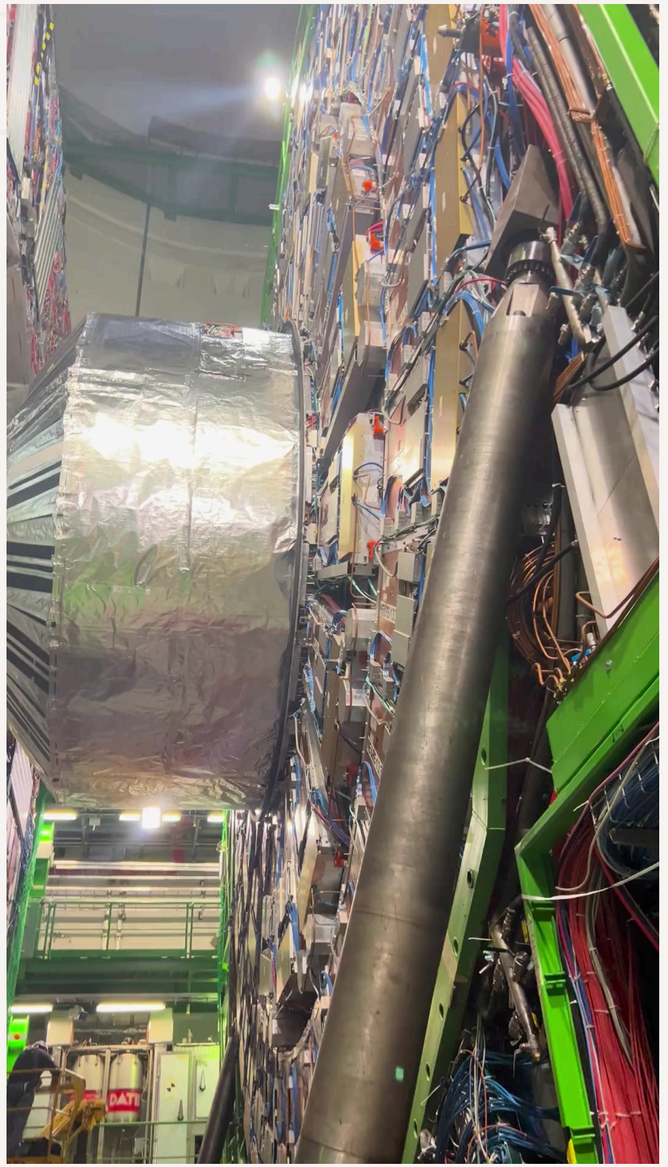
Imperial College London

open data institute

CERN







CMS

What we do



Audiovisual production

Writing & editorial for the CMS website



Social media



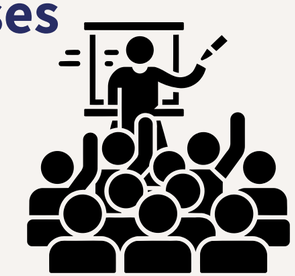


Guiding and virtual visits



Open data and masterclasses





Public events



And much much more…

Our Why

- External **pressures on High Energy Physics** are cu[illegible] the whole field very difficult. We need to be more eff[illegible] showing who we are to a range of different audi[illegible] understandings of physics.
- The wider wor[illegible] **nication**, as these campaigns are easily ampli[illegible] **son and science**!



Key Messages



Some interesting studies

“the higher the awareness of CERN, the higher is the likelihood of paying for its research activity.”
Francesco Giffoni, Massimo Florio,

“Anti-science attitudes, even if held by only a minority of people, raise concerns about a potential crisis of trust in science, which could challenge the epistemic authority of science and the role of scientists”
Cologna, V., Mede, N.G., Berger, S. et al.

Communicating things we cannot see

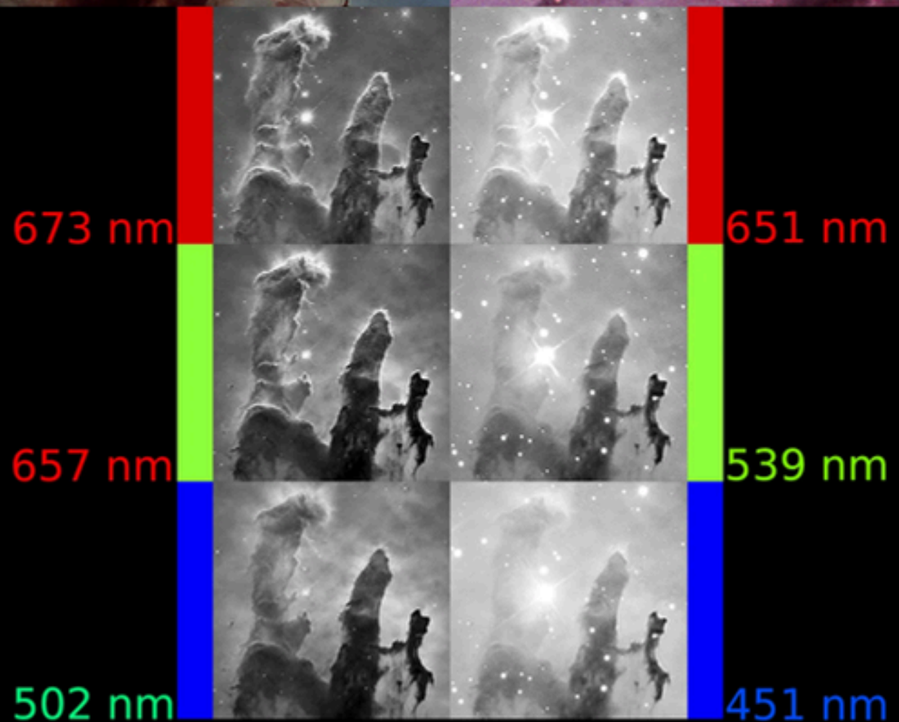


- Unique challenge in talking about things our audiences cannot see
- The impossibly small can be really interesting, but it need abstraction - research done at one specific experiment needs even more understanding
- We have a lot in common with Astrophysics actually: they talk about the impossibly far and we talk about the impossibly small, we often are looking at similar studies in different ways, we both have big experiments (detectors and telescopes) that get signals from what we cannot percieve


Small and Far Away!
Di Hi
Watch on YouTube

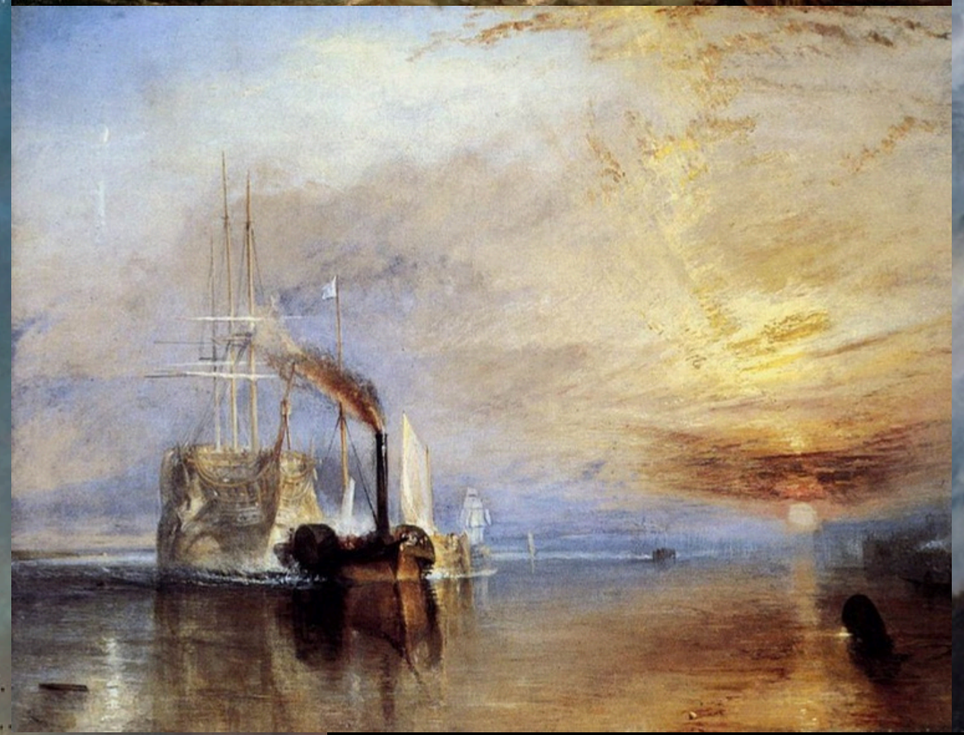




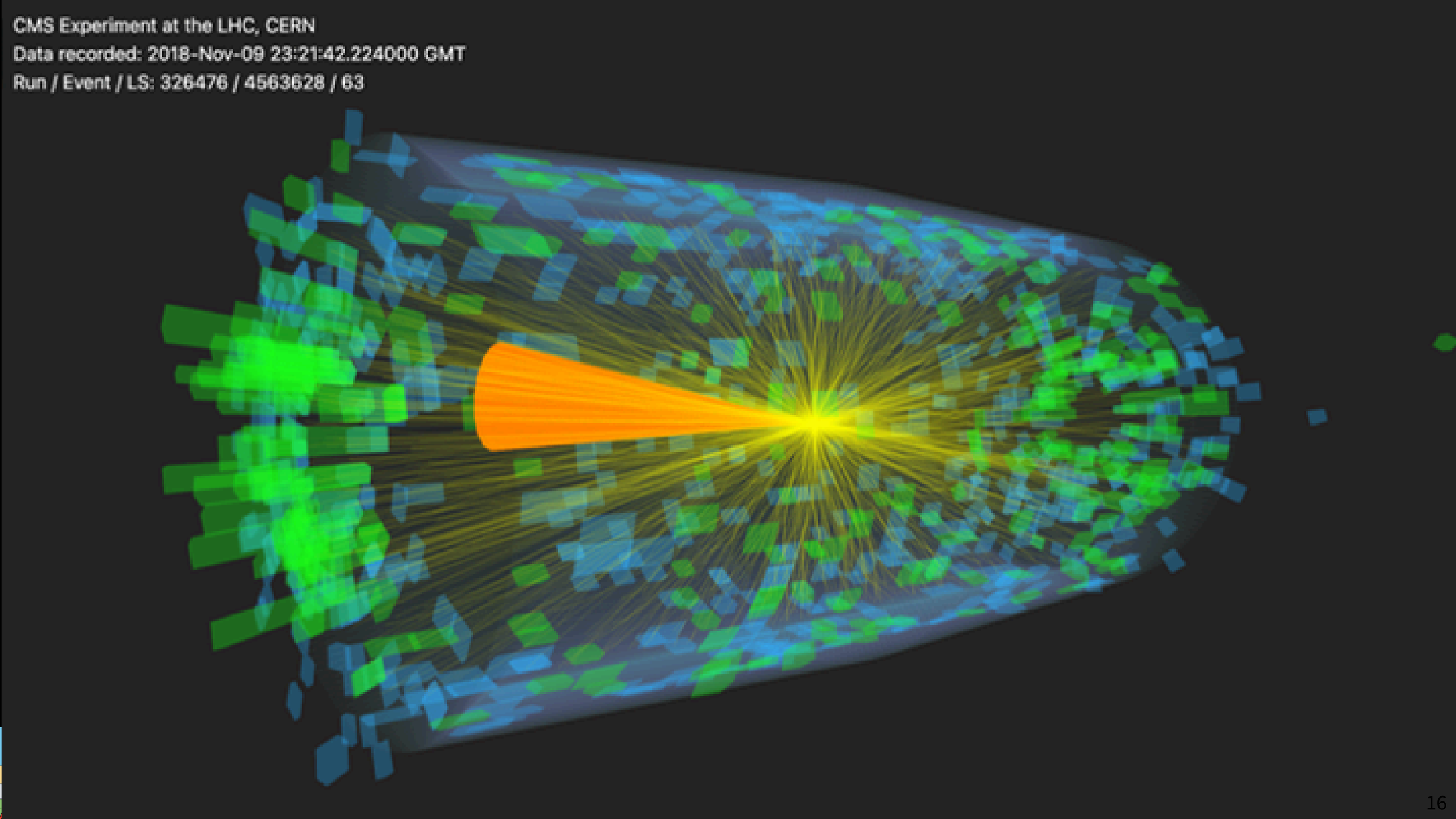

673 nm
657 nm
502 nm
651 nm
539 nm
451 nm

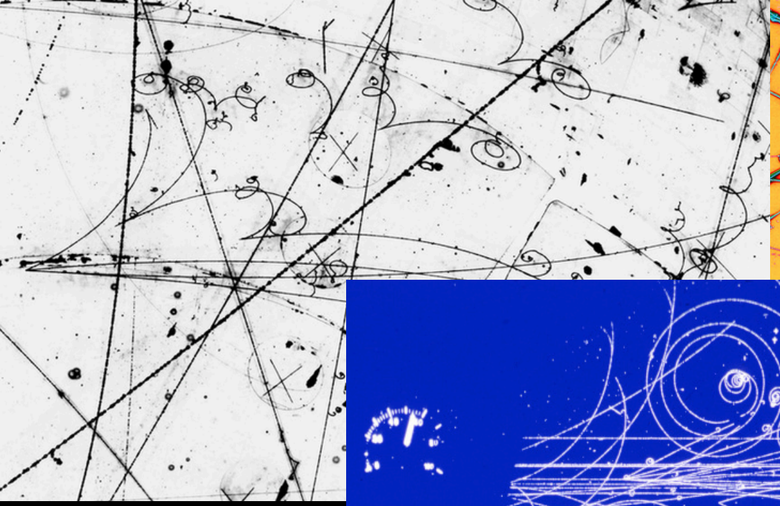


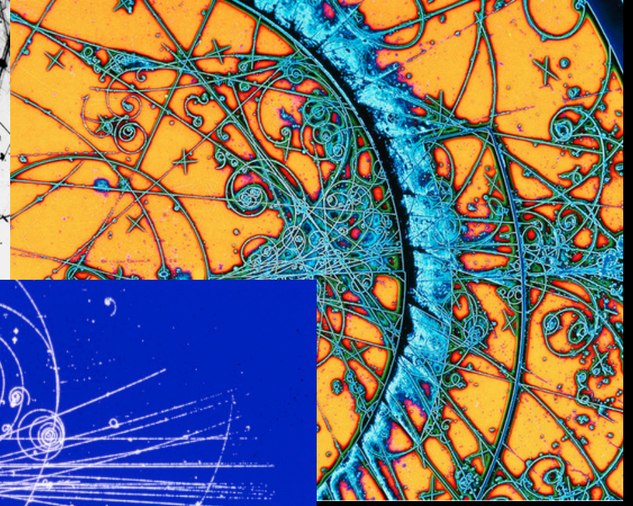


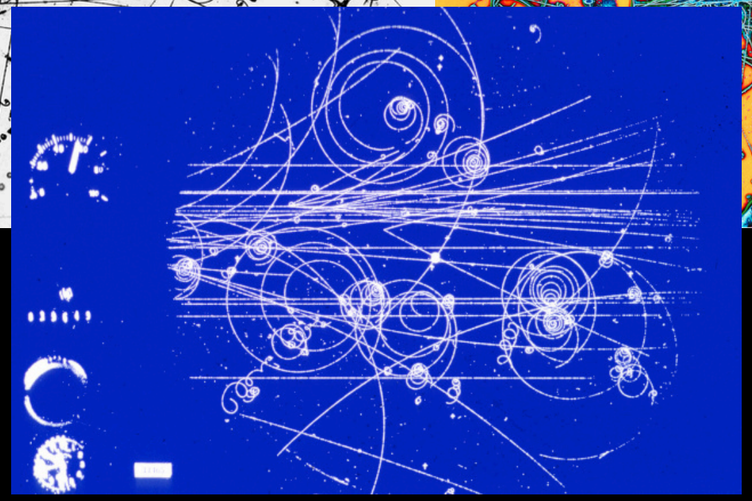


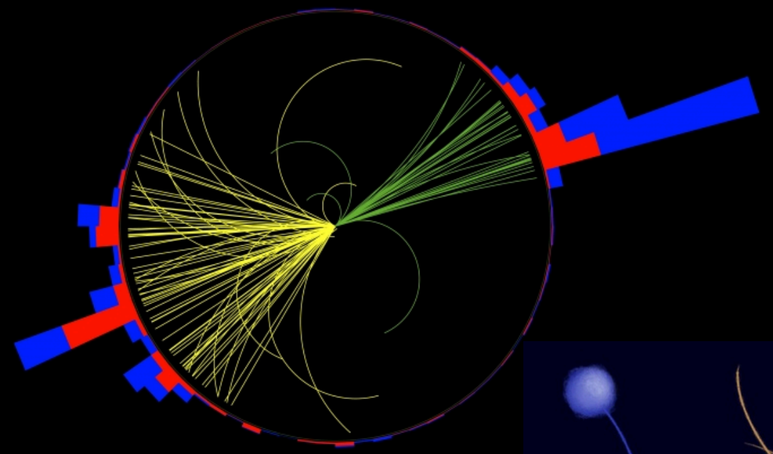


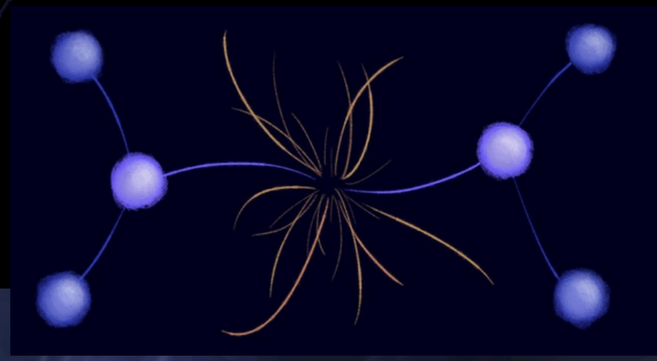

CMS Experiment at the LHC, CERN
Data recorded: 2018-Nov-09 23:21:42.224000 GMT
Run / Event / LS: 326476 / 4563628 / 63

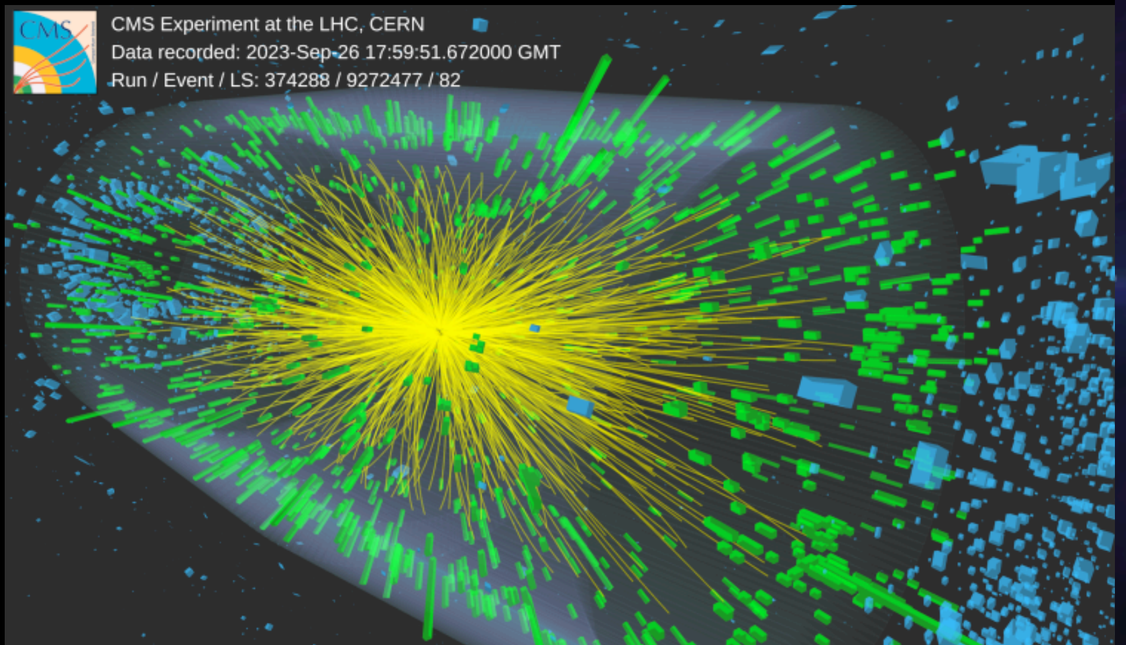


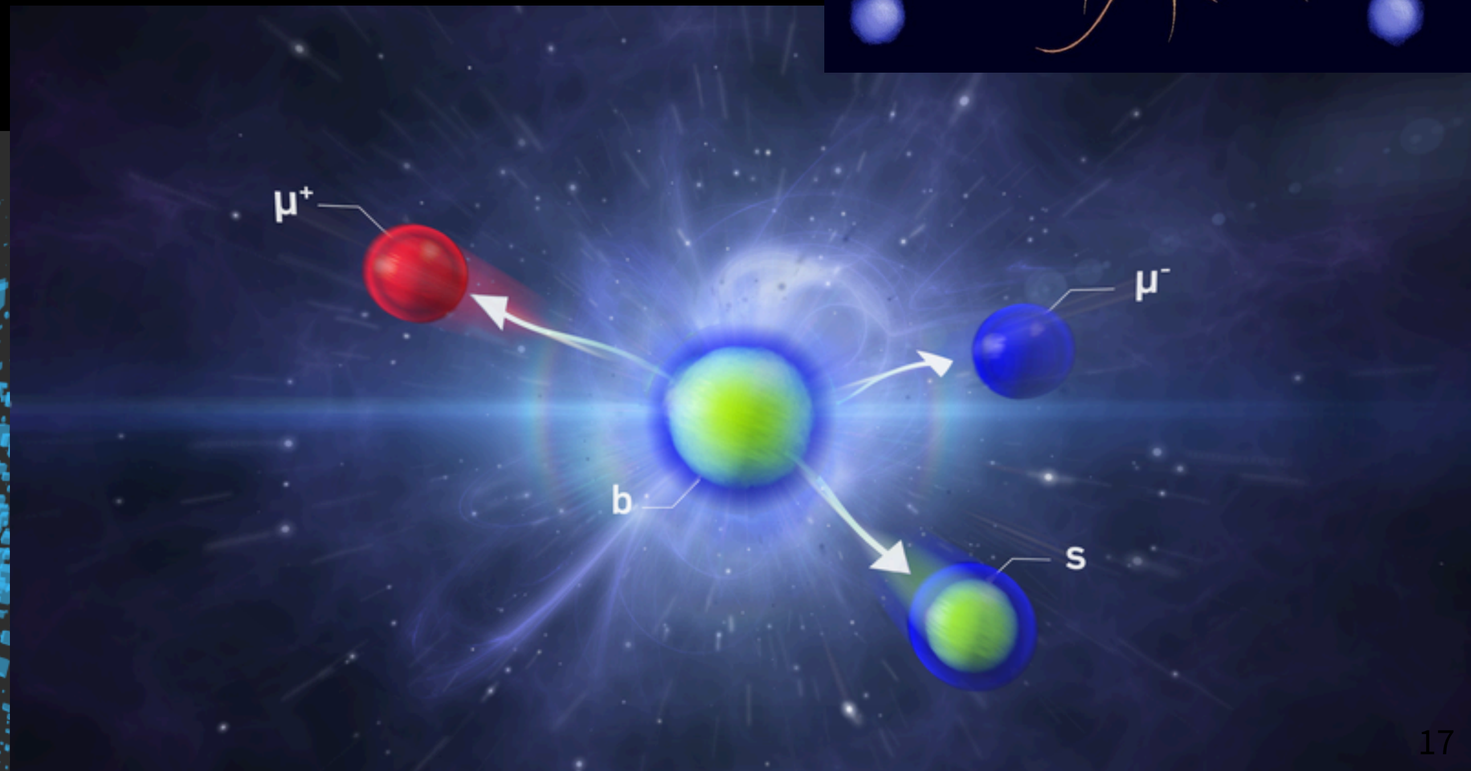




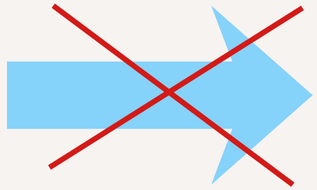


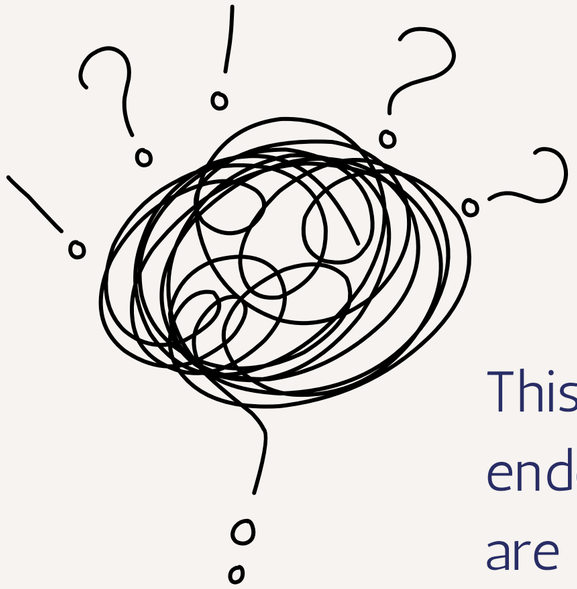



CMS Experiment at the LHC, CERN
Data recorded: 2023-Sep-26 17:59:51.672000 GMT
Run / Event / LS: 374288 / 9272477 / 82


μ+
μ-
b
s

The information defecit

Pushing information to people  the support of those people



Psychology consistently shows humans are influenced by trust, identity, and narrative as much as by facts.

This is why there are brand ambassadors, spokespeople, celebrity endorsements - **people respond to people and their stories** when they are making decisions and creating their world view.

IPPOG, the International Particle Physics Outreach Group, found that the success of future projects in the field “**depend greatly on the establishment of broad public support, as well as the commitment of key stakeholders and policymakers throughout …the world**”



Our Audiences

Education
Students, teachers, schools,...

Science interested public

Other STEM

Politicians

Public

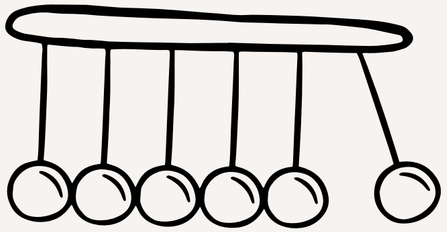


Press

Other particle physicists

Academics

Funding agencies



The information defecit

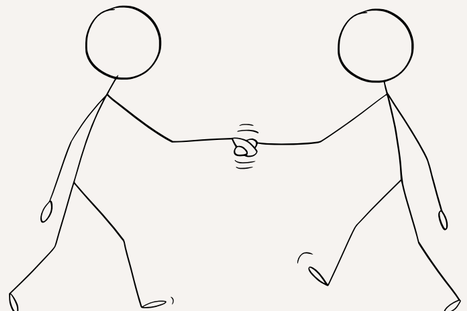
We do not need to sell a product as in the case of marketing, nor are we trying to solicit massive behavioural change as with medical or climate campaigns.

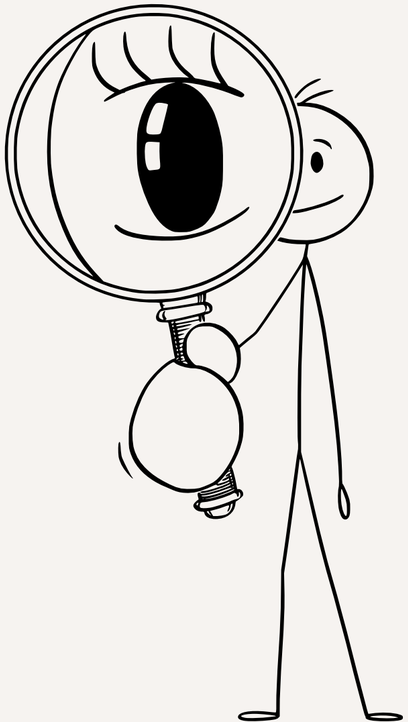
What we want to do is more subtle, and consequently harder to measure.

We need to cultivate **curiosity**, inspire and maintain **trust**, generate **excitement**, and show that **fundamental science is worth doing**.

Establishing the need for fundamental research as a core value for people will help the field continue and grow.

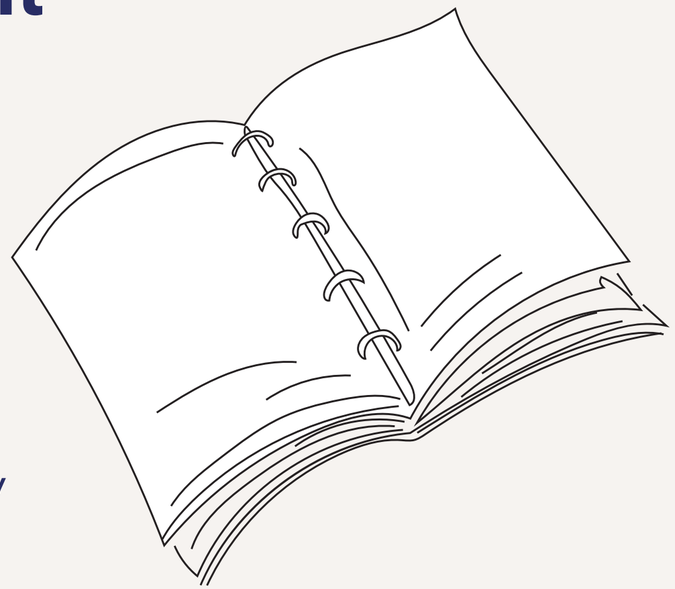






The information defecit

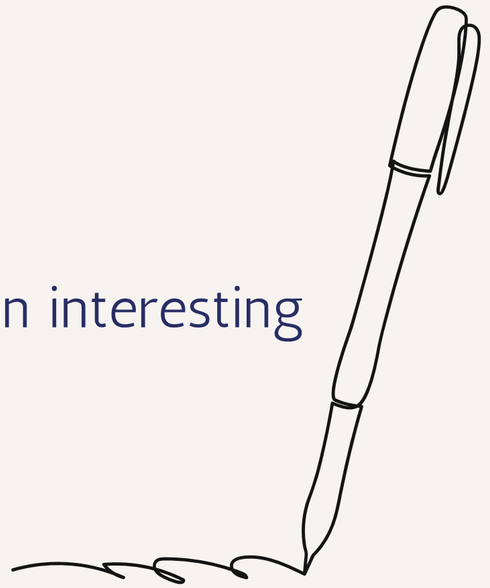
Information → changes understanding
Stories → change engagement





Great News! Our field is already full of stories! Lots and lots and lots and lots of them .....

And with this comes an interesting challenge



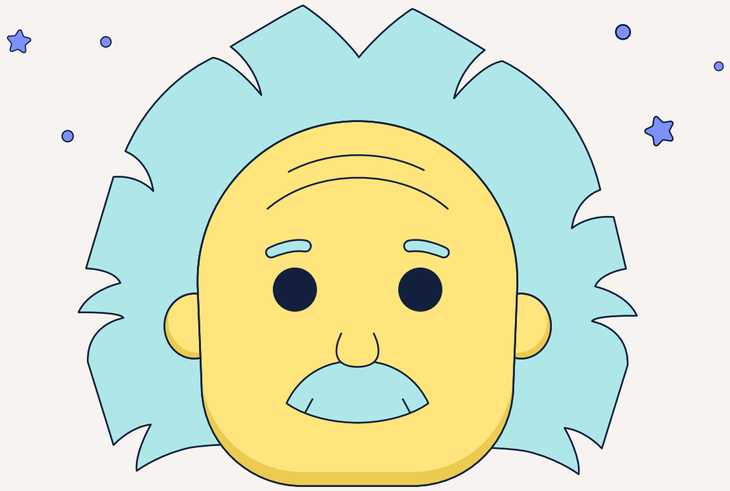
TOO MANY STORIES?



The Lone Genius

There is a misconception that science is made up of lone genius scientists. They sit in a room or work in a lab alone and come up with the answers to the universe. They alone move science forward

We know this is not true, especially in a field like HEP with thousands of people contributing to an experiment.





Keep it human and shift the focus

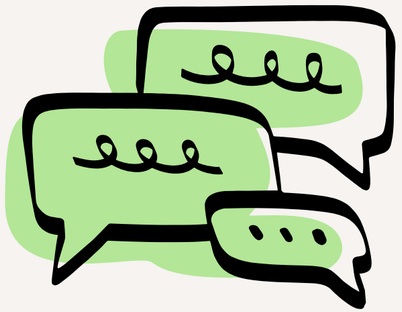


Humanity has reached a point where some questions are so profound that no single person, institution, or country can answer them alone.

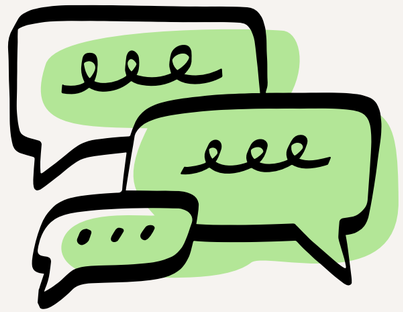
→ We can still reach our audiences in ways where they can connect and identify with our people.

CMS is a collaboration of over 6000 people from different backgrounds without whom it could not function.

The **people are not incidental to the collaboration, but are the story themselves!** This does not mean the singular person does not matter, but that **every one of them is essential in creating the tapestry that is CMS.**



The importance of dialogue



Moving away from a top-down informative approach requires not only that connection with the person in front of you, but a **two-way dialogue** to become a part of the journey - to both hear and be heard in mutual respect.

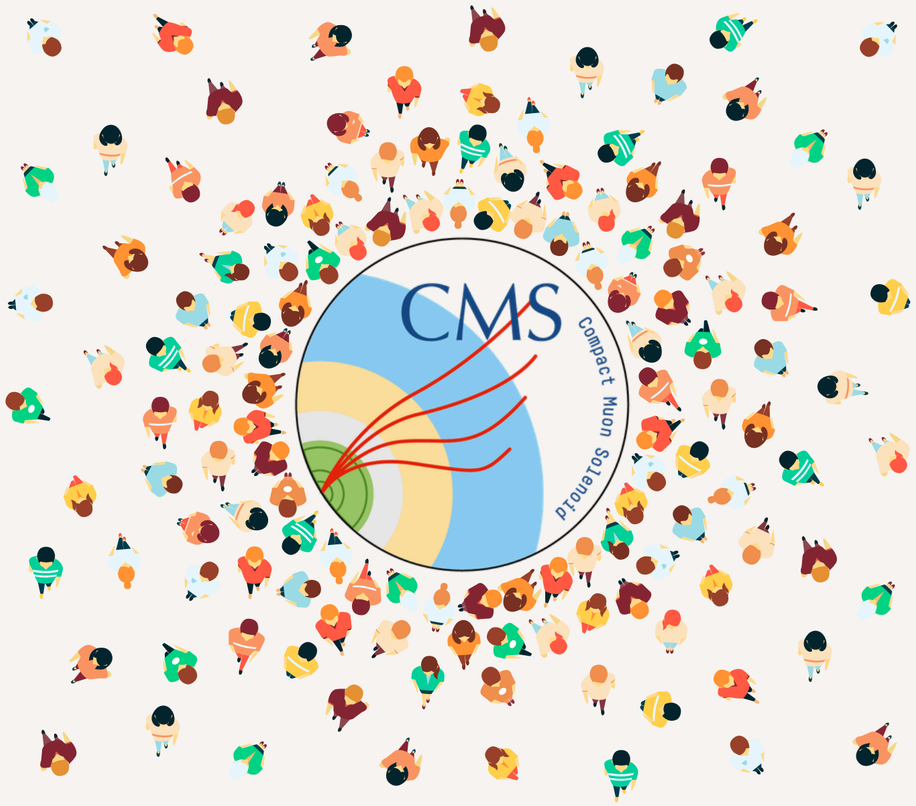
Thank you Paulo Freire!

→ To really create a **lasting, impactful connection** with our audiences, we need **dialogue**! ←

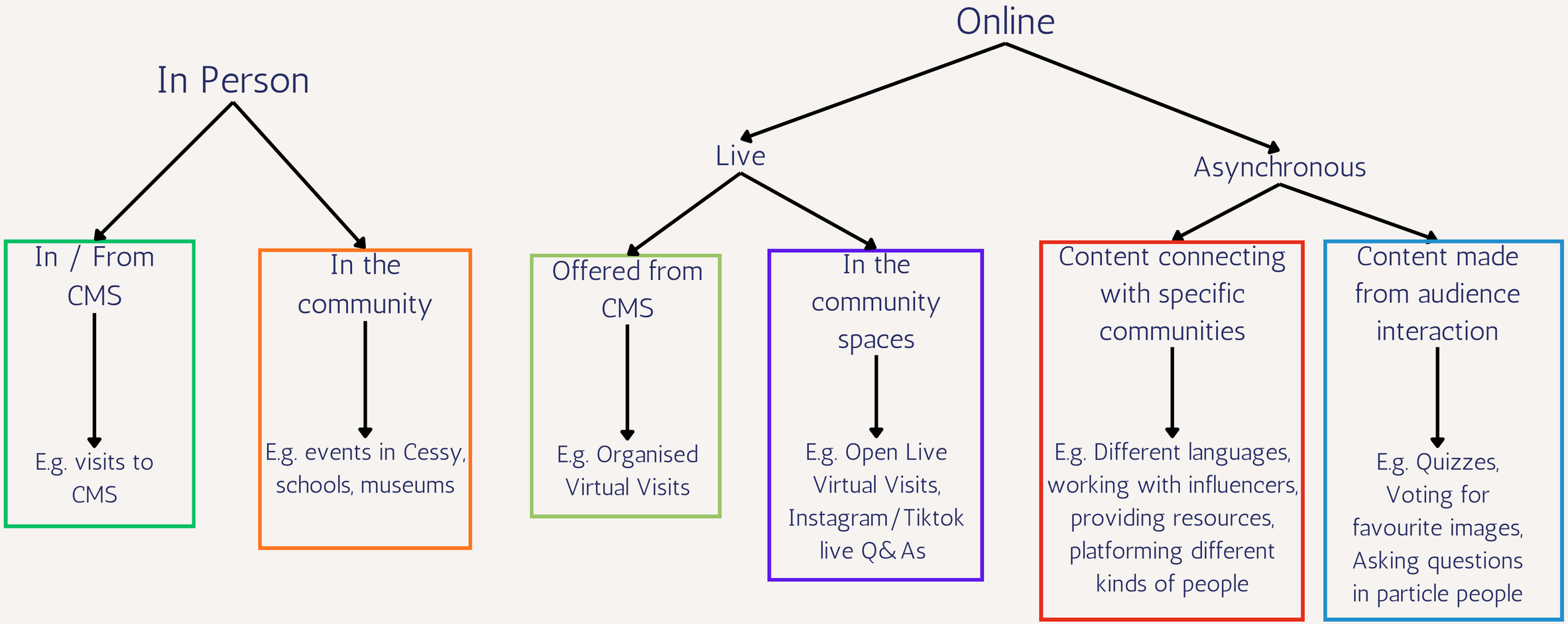
Opening dialogue from a large collaboration to individuals is not trivial, and it runs the risk of being stale, corporate, impersonal.

Being more intentional about dialogue is core to the way we are approaching our connection to our audiences and our humanisation values.

What does this mean in practice?



Creating human connection and dialogue



Dialogue

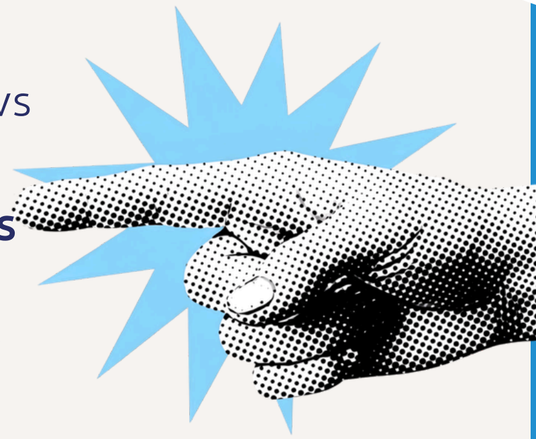
Particle People AMA





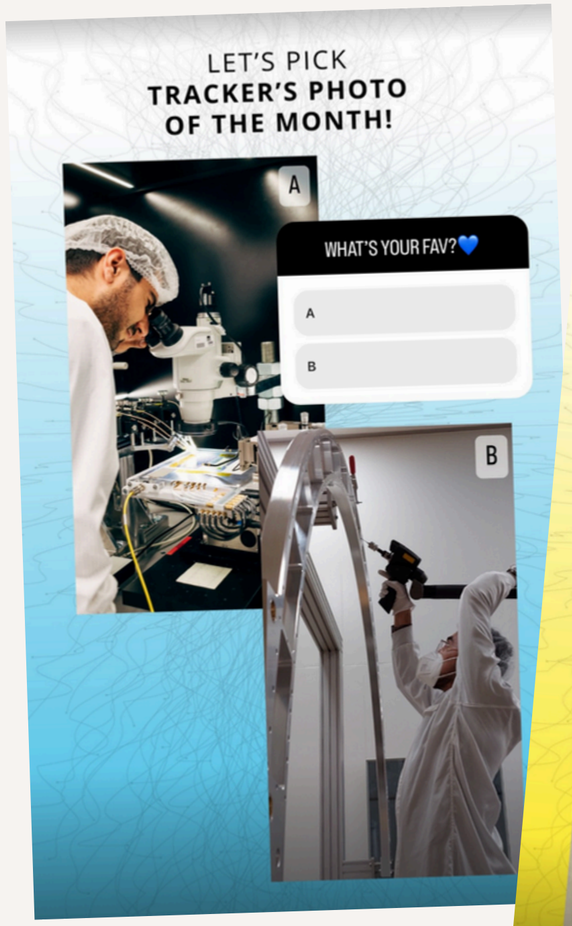


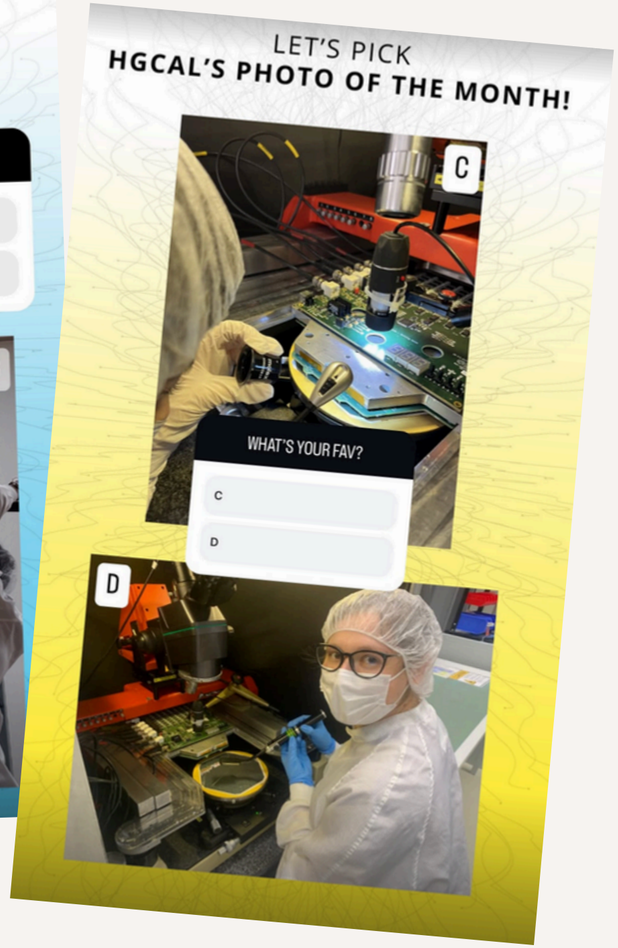
- CMSer introduces themselves and our audiences can **ask any questions**. They then film their reply to those questions.
- Just launched a couple of months ago
- ~even split between follower and non-follower views & interactions.
- **~20 (relevant) comments per video across platforms**
- Questions not answered in the response video are answered either by the person being interviewed or CMS in the comments



Dialogue

Image of the Month Competition

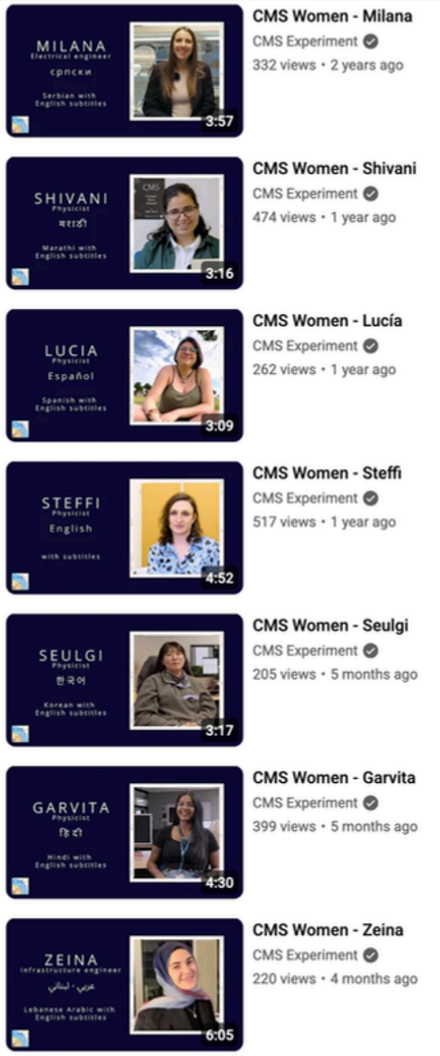




- CMSers send in their photos
- **CMS audiences vote for their favourite** for the month
- We post the winner with explanations
- Audiences have already interacted with all the submissions, not just the winner
- Longstanding series



Producing videos in different languages



Women in STEM

- Longstanding series on Women in STEM, added to on Women in STEM and International Women's day every year
- CMSers talk about their journey **in their mother tongue**, and give advice to other people from their countries who may want to go into science



Multinational Teams

- Interviewed in **several different languages**
- Difficult to edit and check to make sure the translations held, especially for languages we do not have or understand in the team (English, Italian, Greek, French, and Spanish are as far as we stretch in a team of two!)

But one initiative twice a year and the occasional project can only do so much....

Producers from different countries



Italian with JakiDale





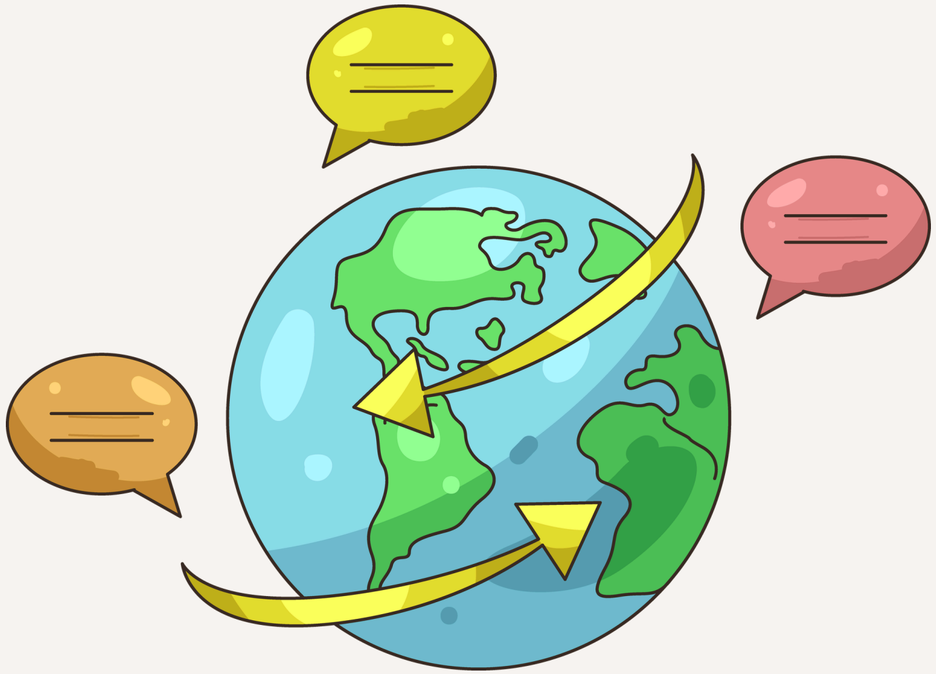
French with Monsieur Bidouille

Spanish with Neutralina

- Work with content creators who **produce videos in a variety of languages**
- Provide them with members of CMS to interview **in their langauge**
- They reach more audiences than we can!

...Still, it would be nice if **our** content had different languages...

The age of AI - New Developments



- Recent developments in AI on socials make it so that **content can be auto-translated.**
- CMS has opened this up on Instagram and YouTube so far, and hope this will be spread across more
- So now, if your feed is all in Portuguese, some of our videos **will sound like they are in Portuguese**!
- This is quite new, does not serve many languages right now, but **more are being added**.
- It is unclear if it affect all videos or not, but it is a promising step in connecting with our audiences in a different way.
- It will be interesting to see if it can translate some of our more complex concepts properly!

Non-Scientific Guests!



Zachary Ruane,
Australian Comedian



Amyl and the Sniffers - Punk Rock band

- How do we reach not (yet)-science enthusiastic audiences?
- People are enthusiastic about other things, and if those influencers or presenters or bands talk about us, there is real potential to just get on different people's radar!

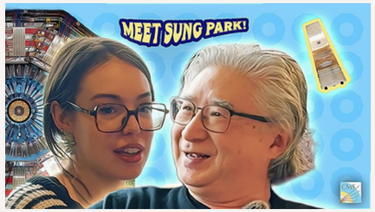
Santa...



Platforming a range of people





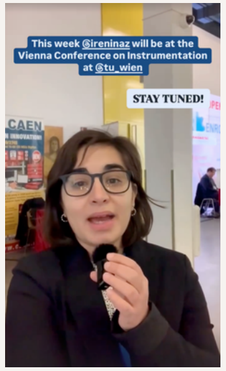














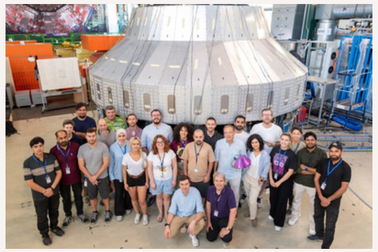


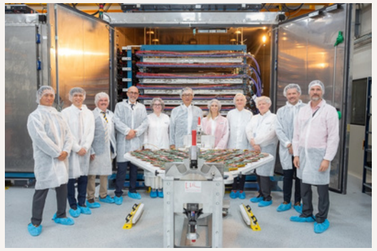
- Who are the people who make up CMS? What are their stories?
- Consciously showing diversity of careers, backgrounds, and roles within the collaboration e.g. showing safety, technicians, computing, engineering, physicists, etc
- Recognising them in **articles**
- Encouraging first person type **blogs**
- Reporting from conferences, highlighting awards, interviews, photos











Platforming a range of people

- An insight into all the many labs around the world that are part of CMS, and what the people within those labs work on! Spotlighting the international aspect of the collaboration.





Dialogue

Audience Organised Virtual Visits



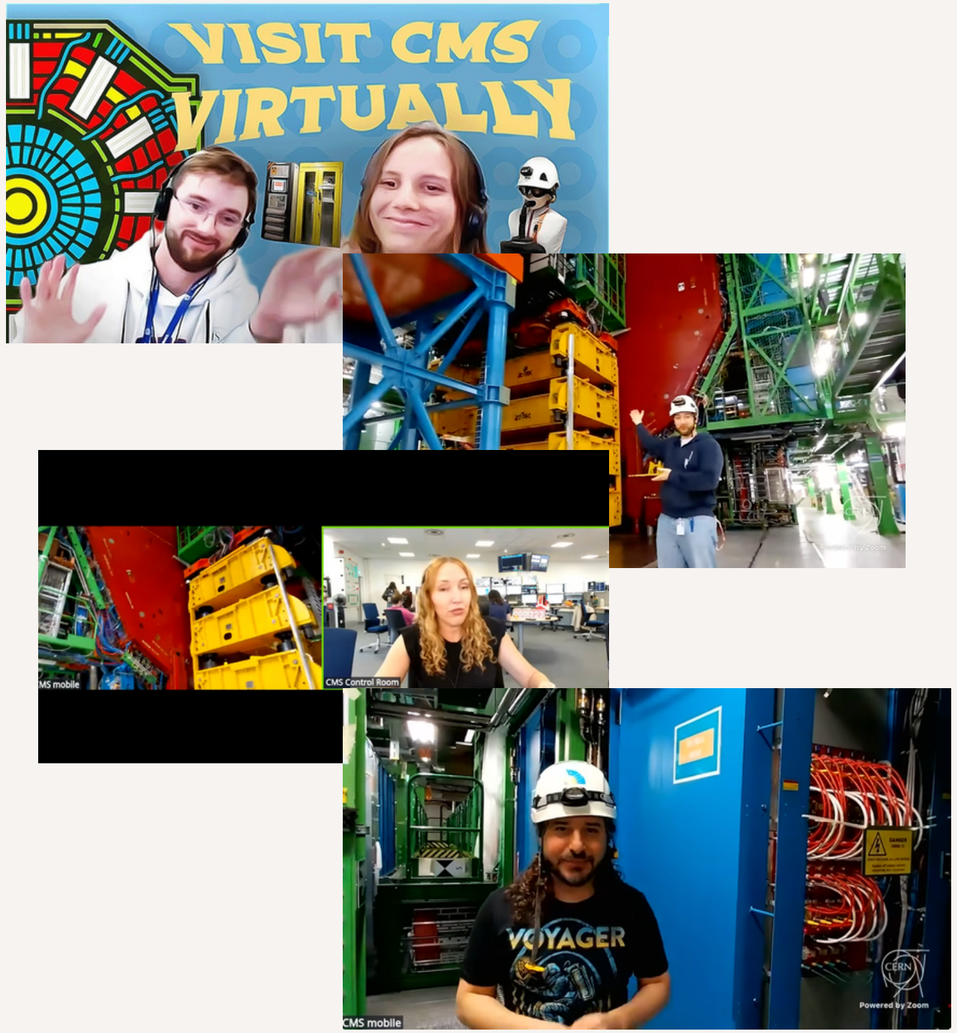
- CMS' longstanding Virtual Visit programme means that **independent groups can request private Virtual Visits** to CMS
- The **visits are in the language requested** by the booker, and we source CMS scientists and engineers who are happy to speak to them in that language.
- Questions can be asked any time by the audience to the virtual guides, so that a **productive dialogue** can be established
- Often there are recurring requests from the same schools etc.

In 2026 we've had multiple visits connecting CMS to US, Brazil, Ukraine, Turkey, Armenia, Portugal, UK, Italy and Hungary just to name a few so far...



Dialogue

Online Live Open Events



- Take a **CMS virtual visit, but make it live and open to the world!**
- Allows individuals who are not part of a pre-organised group to join and interact with our scientists
- The virtual visit is carried out by 2-3 CMS physicists and engineers and tours the CMS P5 site
- Our YouTube channel is still small, but these get an average of about 900-1000 views
- Scheduled to last 45 minutes but **all go longer than an hour due to questions being asked by the audience members**
- With the current in-person visit restrictions, we would like to make this a regular occurance and experiment with different time zones, short formats, and languages!
- Already some experimentation with short form video on Instagram & Tiktok Lives

Dialogue

IRL Events



- **Events in the community around the CMS site** e.g. around the annual Colour Run, dedicated visits, for Fete de la Science, etc
- Support our member institutes with **material for their own events** includeing CMS Virtual Reality and activities
- Have a new programme of outreach events tied to the CMS weeks hosted by our institutes - last year in Seoul, we partnered with the **National Sicence Museum to cohost an event for children**
- Arts at CMS runs a **local school science and art programme** and an art & science exchange with university art courses
- **The Question Guy!**



Has it worked?

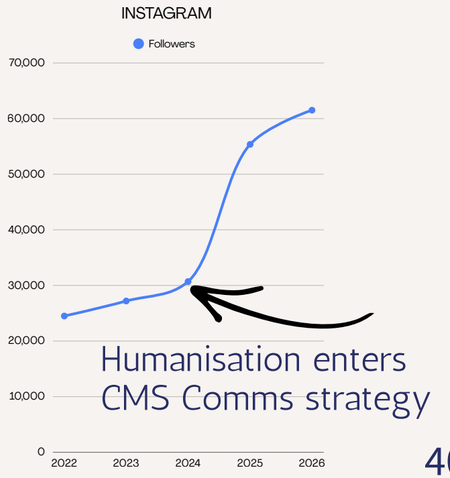


Long-term effects are almost impossible to measure, but we can see indications that the efforts are making a difference and changing the way CMS is interacting with our audiences

- **Consistent interactions** on our dialogue-geared online content: questions being, answered, and conversations going on Open Virtual Visits, initiatives such as Particle People, and online quizzes & competitions.
- Establishment of **long-term relationship** during in-person events: e.g. from a CMS stall at a local Colour Run, people signed up for special tours of the site dedicated to them (too many!)
- More **materials requests** for events coming in from our institutes, particularly for the CMS VR!

But we have a long way to go!

Difficult to draw direct conclusions - numbers are only a small part of the story and we can only see the ones from our own media accounts, not those of everybody who we have worked with.



Has it worked?

Bonjour,

Moi c'est Sacha,
J'ai 8ans, j'ai aimé la visite, la rapidité de l'ascenseur, c'était impressionnant.
J'aurais aimé qu'on m'explique avant les protons et les électrons, car c'est un grand mystère, car ***j'ai envie de devenir scientifique****.*
On a pas vu ça à l'école primaire.
Sacha

Hello,

I am Sacha,
I'm 8 years old, I loved the visit, the speed of the lift, was impressive.
I would have liked to have had protons and electrons explained to me before, because it is a great mystery, because ***I want to become a scientist.***
I had never seen this in primary school.
Sacha



Who are you?

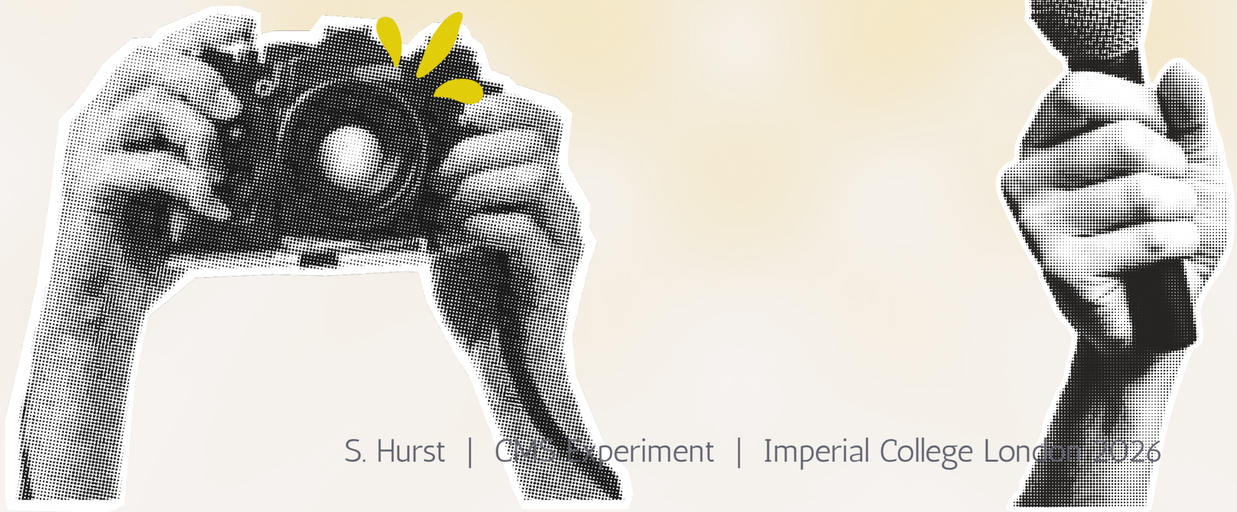
You can be the human other people connect to!

If you have found what I have shared so far interesting, give it a go.

Great for the field - and we desperately need that!

Excellent for your own skills. Being able to speak to different audiences about your work is an essential skill you will need especially as you progress in your academic career.

Practice Practice Practice!



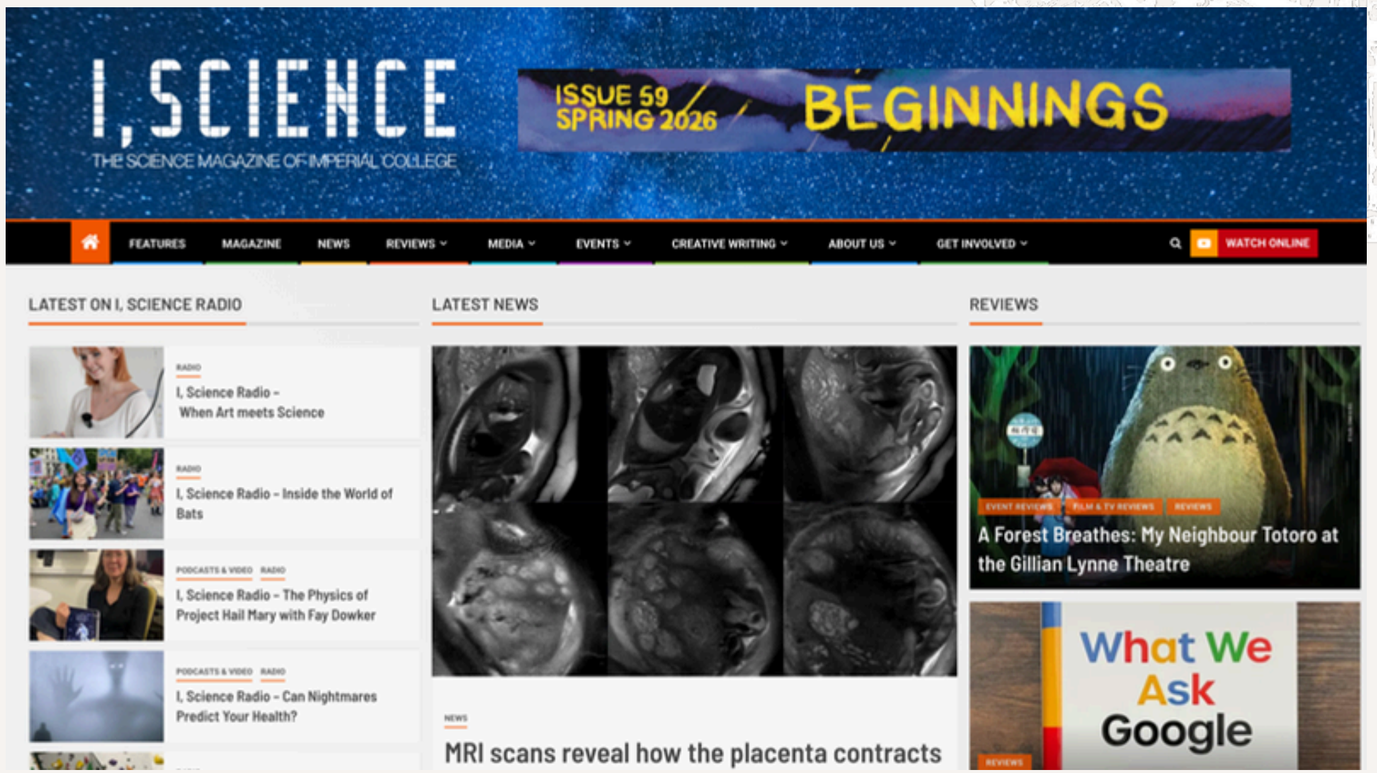
I, Science

You are at Imperial!

Get involved in the magazine, videos, and radio show run by my department here!

Everybody is practicing their skills, whether that means editing a piece you write, being interviewed, or collaborating on a radio show!

These are the future communications specialists, science journalists, documentary makers, radio producers - might be a good idea to start getting to know them now.



Your Experiment

Many of you will have at least two affiliations at play: your university and your experimental collaboration.

Often, both are looking for stories and people to interview!

If you have a good result, want to show behind-the-scenes at an Imperial lab, or have any other idea, reach out to talk to them.

For CMSers, email cms.comms@cern.ch or find me on mattermost!





Pint of Science!

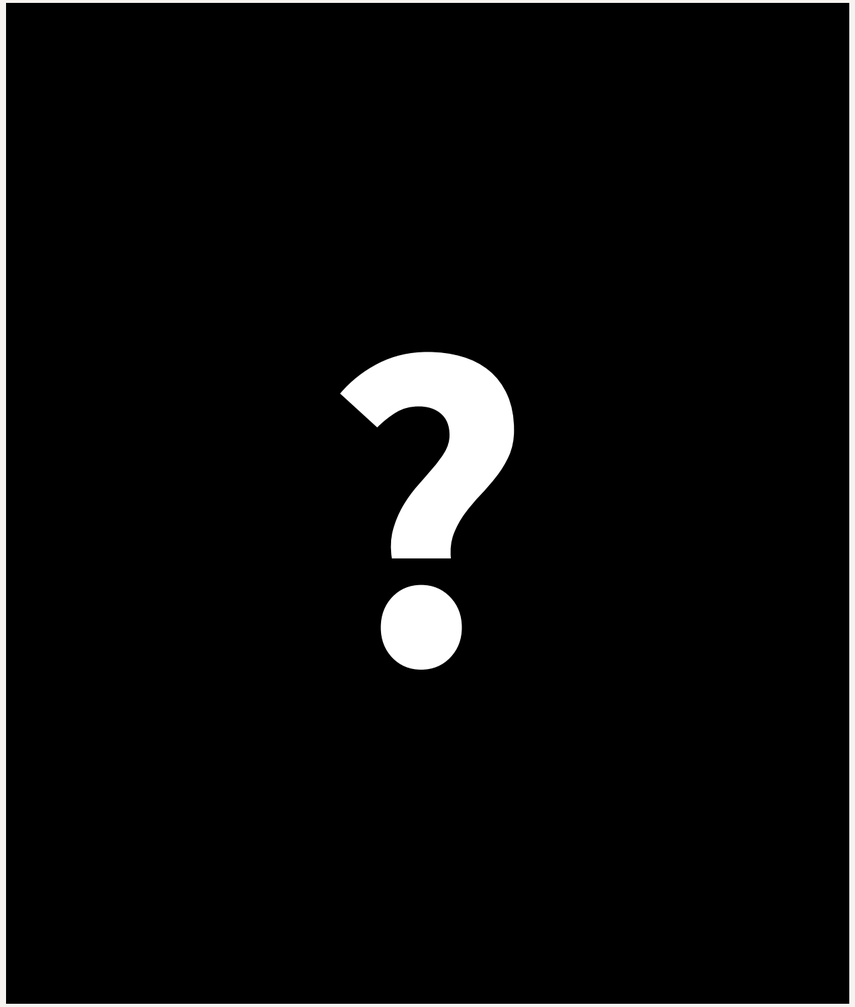
Evenings in the pub, listening to really interesting research!

Why not volunteer to tell people about yourself and your research?

Great to practice in front of a non-physics audience and extremely rewarding!



Start your own series or idea!



Trainings

It is not your job to magically know how to do this, but look out for communications trainings!

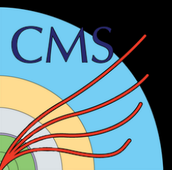
CMS and CERN offer some and I am sure other places do too.







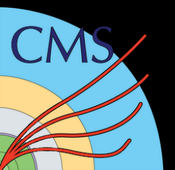
Know Your Audience

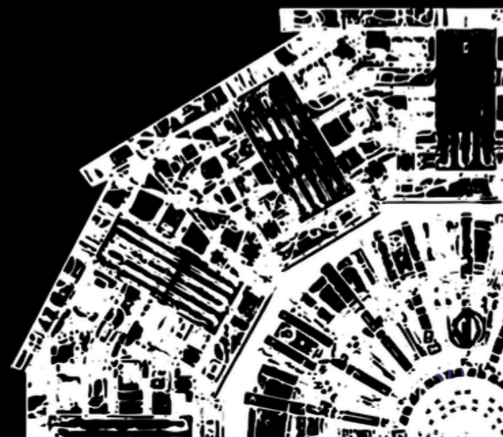


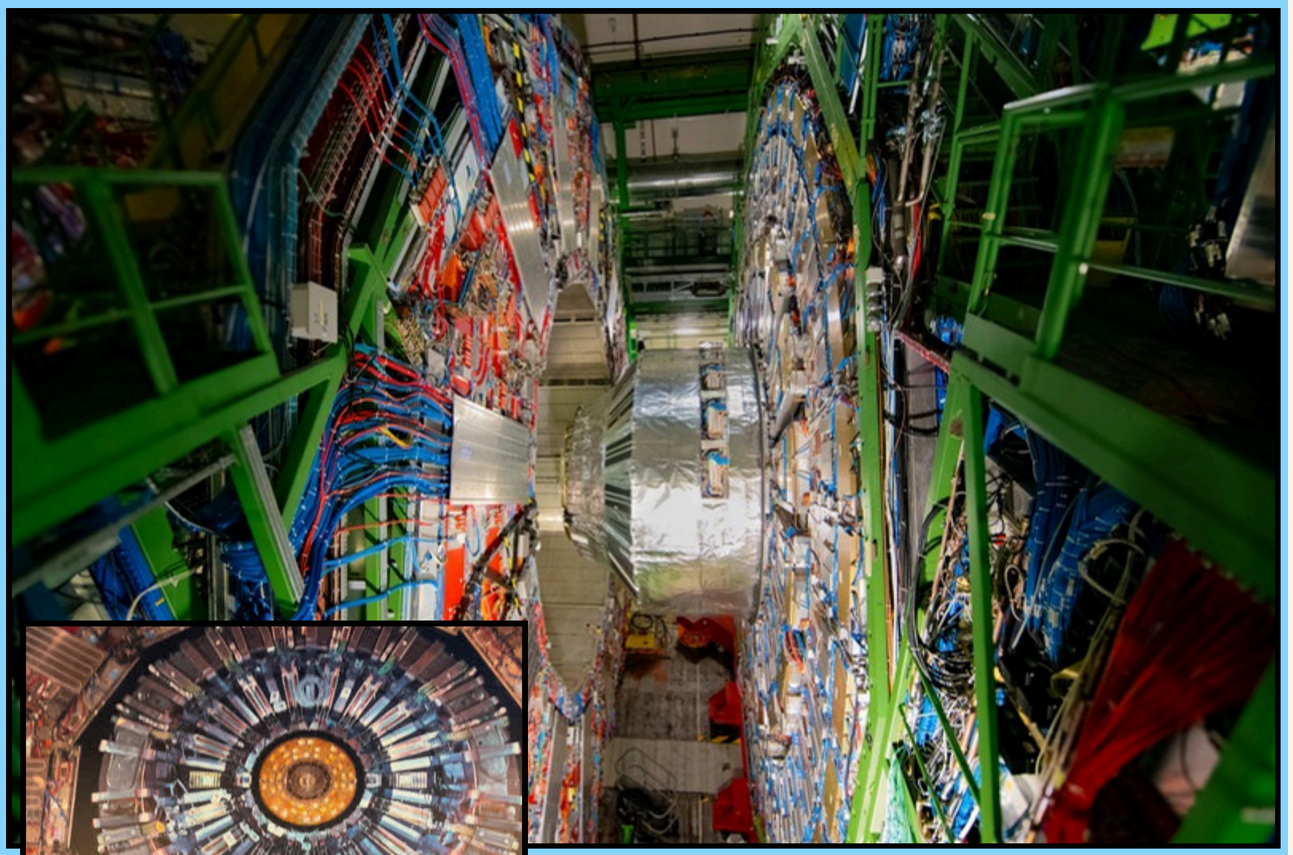


Assume Intelligence, Not Knowledge

Have A Clear Message









You can reach me:
sofia.hurst@cern.ch

Or the Comms Team:
cms.comms@cern.ch

Follow us!

Website
cms.cern

Tag us

Social Media
@CMSExperiment

LinkedIn
CMS Collaboration

SCAN ME

TikTok
@cms_experiment

Some interesting studies

"the higher the awareness of CERN, the higher is the likelihood of paying for its research activity."

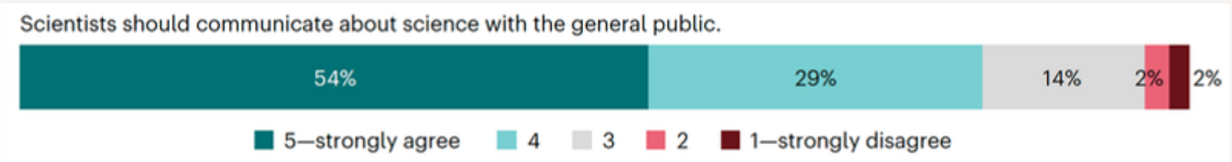
"No relevant differences exist between the two countries [Switzerland and France] because the statistically significant determinants are the same. Apart from income and controlling for individual traits, they are related to the following issues: i) awareness of CERN; ii) scientific interest; iii) CERN permits to increases knowledge of universe; iv) The research activity at CERN should increase in the coming decades."

Francesco Giffoni, Massimo Florio,
Public support of science: A contingent valuation study of citizens' attitudes about CERN with and without information about implicit taxes,
Research Policy,
Volume 52, Issue 1,
2023,
104627,
ISSN 0048-7333,
https://doi.org/10.1016/j.respol.2022.104627.

→ A study asking Swiss people what they would be willing to pay in taxation for CERN research and comparing it to similar survey done in France

"Anti-science attitudes, even if held by only a minority of people, raise concerns about a potential crisis of trust in science, which could challenge the epistemic authority of science and the role of scientists"
Cologna, V., Mede, N.G., Berger, S. et al.

"Public perception of scientific integrity—one of four components of trust—is somewhat high, but perceptions of scientists' openness are lower. Therefore, scientists wishing to gain public trust could work on being more receptive to feedback and more transparent about their funding and data sources, and invest more effort into communicating about science with the public—which we found to be desired by 83% of respondents. We recommend avoiding top-down communication but encouraging public participation in genuine dialogue, in which scientists seek to consider the insights and needs of other societal actors."



Cologna, V., Mede, N. G., Berger, S., Besley, J., Brick, C., Joubert, M., Maibach, E. W., Mihelj, S., Oreskes, N., Schäfer, M. S., Abdul Aziz, N. I., Abdulsalam, S., Shamsi, N. A., Aczel, B., Adinugroho, I., Alabrese, E., Aldoh, A., Alfano, M., Ali, I. M., . . . Zwaan, R. A. (2025).
Trust in scientists and their role in society across 68 countries.
Nature Human Behaviour, 9(4), 713-730.
https://doi.org/10.1038/s41562-024-02090-5

Key Messages

The Public are fascinated by our research. Particle physics is the modern equivalent of "where are we going?"

Fabiola Gianotti at ICHEP panel session 2024

Key Messages



Key Messages

VERY LITTLE OF OUR UNIVERSE IS UNDERSTOOD & **CMS HELPS US TO UNDERSTAND MORE**

FUNDAMENTAL SCIENCE IS **WORTH PURSUING**

Key Messages



VERY LITTLE OF OUR UNIVERSE IS UNDERSTOOD & **CMS HELPS US TO UNDERSTAND MORE**

FUNDAMENTAL SCIENCE IS **WORTH PURSUING**

Key Messages



WE SHOULD CELEBRATE CMS AS A **JOURNEY**

CMS IS A **WORLDWIDE** COLLABORATION OF PEOPLE FROM MANY **DIFFERENT DISCIPLINES**, WITHOUT WHOM IT WOULD NOT FUNCTION



Key Messages



WE SHOULD CELEBRATE CMS AS A **JOURNEY**

CMS IS A **WORLDWIDE** COLLABORATION OF PEOPLE FROM MANY **DIFFERENT DISCIPLINES**, WITHOUT WHOM IT WOULD NOT FUNCTION

Key Messages

CMS IS WORTH THE FUNDS

"...the higher the awareness of CERN, the higher is the likelihood of paying for its research activity."

F. Giffoni, M. Florio