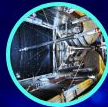




Diverse, Inclusive, & student-led, online STEM engagement





LHCb



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Latest Questions

When physicists say something is instantaneous, what do they actually mean?

PatrycjaG

When colliding particles, how do you measure and detect the subsequent particles that may appear as a result

Ben L

How do you predict your area of physics to progress over the next decade?

Ben L

Next Chat:



Whats happening in the zone?

Tuesday – Live Chat – Scientific Setbacks: the Science of Failing May 8, 2023

Scientific Setbacks: the Science of Failing May 2, 2023

Team update: A new

View all answered questions

Welcome to CERN at I'm a Scientist





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LHCb

Follow team

“ LHCb experiment specializes in investigating the slight differences between matter and antimatter by studying a type of particle called the "beauty quark", or "b quark". ”



What does the acronym stand for?:

Large Hadron Collider beauty

The Large Hadron Collider beauty (LHCb) experiment specializes in investigating the slight differences between matter and antimatter by studying a type of particle called the "beauty quark", or "b quark".

CERN facilities:

Large Hadron Collider

What this team has been up to:

Scientific Setbacks: the Science of Failing May 2, 2023

Team update: What have LHCb been up to? February 15, 2023

Join the Live Chat Tomorrow January 23, 2023

Welcome to the CERN Zone! November 30, 2022

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Our Answered Questions

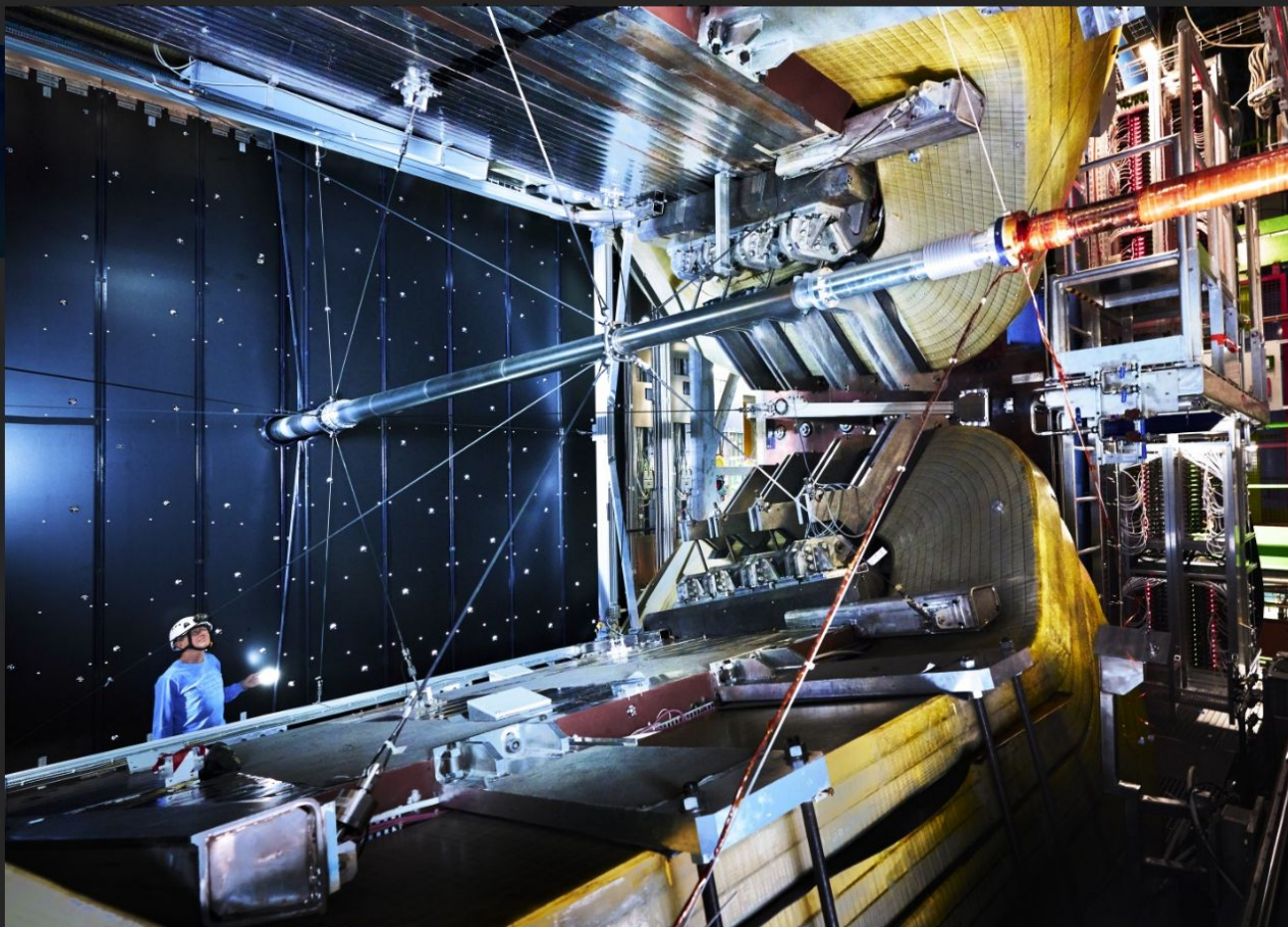
When physicists say something is instantaneous, what do they actually mean?

When colliding particles, how do you measure and detect the subsequent particles that may appear as a result of the

How do you predict your area of physics to progress over the next decade?

What kind of qualifications are needed to go into data analysis at CERN?

How many particle collisions does LHC do on average each day?



What does the acronym stand for?

Large Hadron Collider



When physicists say something is instantaneous, what do they actually mean?

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Mary Richardson-Slipper



About Me:

I am a PhD student at the University of Edinburgh. I live in Geneva, Switzerland to work at CERN

I play rugby

listen to lots of music

and I love to crochet

My pronouns are:

she/her

My Work:

I'm an experimental particle physicist on the LHCb experiment. I am using data from the LHC to find differences between matter and antimatter!

★ My Current Zones

- [CERN Zone](#)

✎ Students, ask a question

Your question:

[ASK THIS QUESTION!](#)

☰ Questions answered by Mary

What kind of qualifications are needed to go into data analysis at CERN?

Where did the name 'beauty quark' come from? What sets it apart from other fundamental particles?

Would electromagnetic waves such as gamma refract the same way light does in mediums?

How did you get into research science? Did you just happen to end up in it or was it always a dream and, if so, how did

What A levels will I need to do something

I'd like to stay in Particle Physics research. I would love to stay on LHCb, but maybe I would like to look at neutrinos too! I'm not sure yet.

My Interview

How would you describe yourself in 3 words?

rugby-playing *crocheting* *physics-loving*

What did you want to be after you left school?

a brain surgeon

Were you ever in trouble at school?

Not very often, but when I was at primary school I never did my homework... I got better at secondary school!

If you weren't doing this job, what would you choose instead?

Probably a physics teacher, or I'd love to make games for Nintendo!

Who is your favourite singer or band?

Pink Floyd

My CV

Education:

I went to St. Bede's Catholic Voluntary Academy in Scunthorpe from 2010 – 2015 where I did my GCSEs. I did my A-Levels at John Leggott Sixth Form College from 2015 – 2017. I studied my 4-year Masters in Physics with Theoretical Physics at the University of Manchester from 2017 – 2021. I am now at the University of Edinburgh and hope to graduate with my PhD in 2025.

Qualifications:

GCSE: English, Maths, Biology, Chemistry, Physics, R.E., Geography, French, Product Design (Design and Technology), Computer Systems and Programming

AS Levels: Further Maths, Biology, Critical Thinking

A Levels: Physics, Chemistry, Maths

Degree: MPhys in Physics with Theoretical Physics

Work History:

Volunteer at Cancer Research charity shop (2015)


Summer School Mentor (Summer 2017)

Summer intern at British Steel in Scunthorpe (2018)


Tour guide at Jodrell Bank Discovery Centre (2021)


Job title:

What's happening in your zone

 Tuesday – Live Chat –
Scientific Setbacks: the Science of Failing May 8, 2023

 Scientific Setbacks: the Science of Failing May 2, 2023

 Team update: A new way to produce top quarks with CMS! April 20, 2023

 Welcome back to the CERN Zone! April 18, 2023

 Tomorrow's Chat: Radiation, Nuclear Weight and Antimatter March 20, 2023



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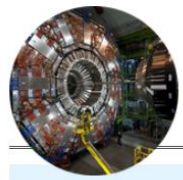


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Team update: A new way to produce top quarks with CMS!

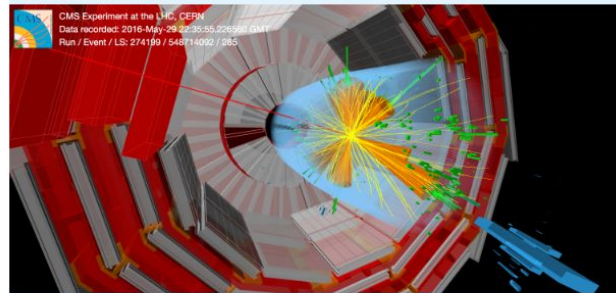


The CMS (Compact Muon Solenoid) detector uses a huge solenoid magnet to bend the paths of particles from collisions in the Large Hadron Collider.

The **CMS team** gave us an exciting update from team members **Joel** and **Vichayanun**:

The CMS collaboration has seen evidence of a rare mechanism to produce 4 top quarks!

The simultaneous production of 4 top quarks is predicted by the standard model. As a bonus, the process is sensitive to many hypothetical undiscovered particles and forces that could subtly change how often 4 quarks are made (and how they behave). The new result has a significance of 3.9 standard deviations. That means that the chances of the result being a statistical fluke are very small – only about 1 in 20,000!



CMS Experiment at the LHC, CERN
Data recorded: 2016-11-09 09:23:35.270826 6341
Run / Event / LS: 274189 / 548714090 / 285

Next Chat:



? Ask a question about this

Your question:

ASK THIS QUESTION!



Take the Quiz

Explore the site, use team updates, team

Live Chat for Greater Peterborough UTC

@Annabel

My PhD project involves investigating cells called macrophages in cancer that has spread to bones. I work with cancer cells and mouse tissues to look at what macrophages are doing and how they make the cancer grow.

@Bradley

I work on a type of blood cancer known as Acute Myeloid Leukaemia. In my PhD, I'm trying to figure out how and why normal, healthy, happy blood cells turn into a bad version of themselves that leads to the cancer.

@Sophie

I am currently researching a childhood cancer called Ewing (Young) Sarcoma that is usually found in bones. We are looking for cells and genetic material in the blood that are released by the cancer.

Logged in as: modbella (modbella)

Title: Greater Peterborough UTC

Code: No code

Visibility: Private

[Edit this session](#)
[Go to sessions](#)
[Back to welcome screen](#)

Session is running.

Pause

- Sophie:** @ands458tub: It can help you to be certain that it's the right field for you, but not essential. You can always get work experience while at university over the summers! [Reply](#)
- 22 cash458tub:** @all, if I wanted to go into biology with no experience, how would that go? [Reply](#)
- 21 care458tub:** @all How did you all start you personal statement? [Reply](#)
- Bradley:** @care458tub: 100%! It's always good to try and help out where you can [Reply](#)
- 18 card458tub:** @all what is the most rewarding part of your work? [Reply](#)
- Annabel:** @cash458tub: I picked to study biology at uni purely because I enjoyed my lessons in school and as a result did well in them - you don't need a wealth of experience to study bio at uni! [Reply](#)
- Zahra:** @cash458tub: Completely fine/ As long as you have done biology A level, that's usually the only prerequisite. Apart from enjoying the subject! [Reply](#)
- Sophie:** @cash458tub: Absolutely fine at this point! As long as you enjoy biology, you can pick up experience along the way [Reply](#)
- Bradley:** @cash458tub: I think it would be fine. As long as you've done the required A-levels etc [Reply](#)
- 22 cash458tub:** @all, i got a gcse [Reply](#)
- Zahra:** @care458tub: Probably with something naff like "I want to be a doctor because...". Don't do that, it's boring as anything :) [Reply](#)

Write your message and hit 'send'

SEND

@all @Annabel @Bradley @Sophie


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Question: Where did the name 'beauty quark' come from? What sets it apart from other fundamental particles?



0

Keywords: beauty, fundamental, particle, quark

Asked by [Ben L](#) on 6 Mar 2023.



[Mary Richardson-Slippe](#) answered on 6 Mar 2023:



1

So in the Standard Model of Particle Physics, we have 6 quarks. We group them into three pairs we call 'generations'. In each pairing, there is a positively charged quark with a charge of $+2/3$, and a negatively charged quark with charge $-1/3$. We have 'up' and 'down', 'charm' and 'strange', and the third generation 'truth' and 'beauty', or 'top' and 'beauty' or 'top' and 'bottom' (it depends who you ask on which name they use!).

There are a lot of theories about where they got their names. The strange quark was the first to be discovered because of some 'strange behaviour' – hence the name. I don't know of the story behind the beauty quark, but I think whoever found them probably just needed another pair of words!

As for why beauty quarks are set apart from the others, the beauty quark is heavier than the up, down, strange and charm, but not as heavy as the top. We produce a lot of beauty quarks in collisions at the LHC and because they live a bit longer than the others, we can pick them out from the crowd. Particles containing beauty quarks are great laboratories for studying phenomena such as CP violation which helps us understand the difference between matter and antimatter!



[Jonathan Edward Davies](#) answered on 8 Mar 2023:



Related Questions

What is the wavefunction? Is it a sea of probability of where the particle could lie? If so, are particles always found

How did you discover particles in the standard model (how do you measure a particle's spin/mass) and is there a limit

What is the use in trying to create antimatter? Accelerating particles and causing collisions to produce antimatter



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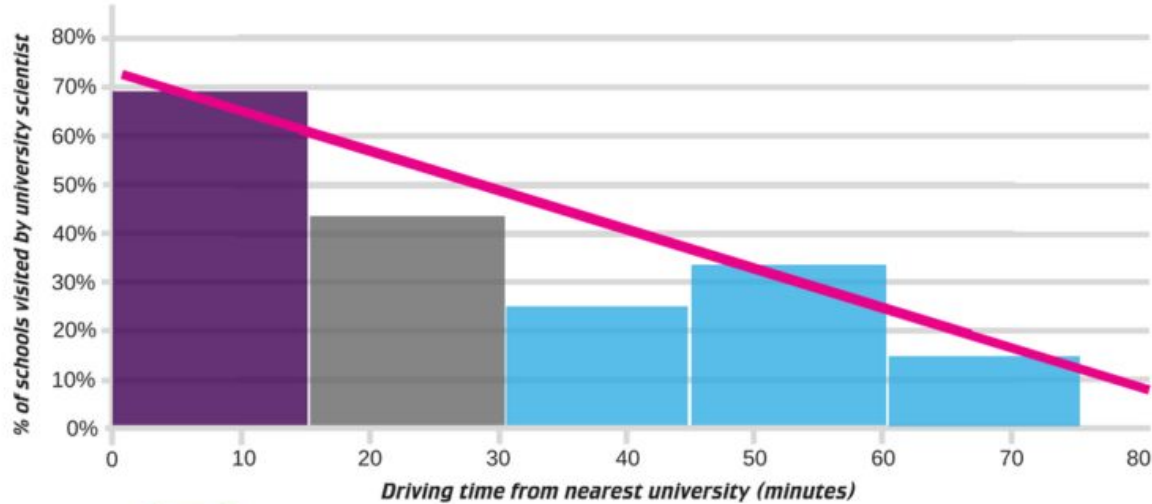
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Equality
Diversity
Inclusion

Equality



Nearly **70%** of schools within 15 minutes of a university had visits from university scientists



Schools more than 30 minutes away were visited less than half as often

Initial data suggests likelihood of a visit decreases by around 1% per minute's drive

SUBMIT YOUR QUESTION

Or you can ask another scientist from this zone



Ask Volpe



Ask Vichayanun



Ask Ted



Ask Sudan



Ask Rizwaan



Ask Michael



Ask Mei



Ask Mary



Ask Liam



Ask Kathryn



Ask Jonathan



Ask Jakob



Ask Georgy



Ask David



Ask Carsten



Ask Benji



Ask Annie

Check the box to ask all the scientists.

Collide

with modern
physics
experiments



Accelerate

your learning
through quizzes
and live Chats



Discover

current
experimental
procedures and
results



I'm a
Scientist
Get me **OUT** of here



Inclusion

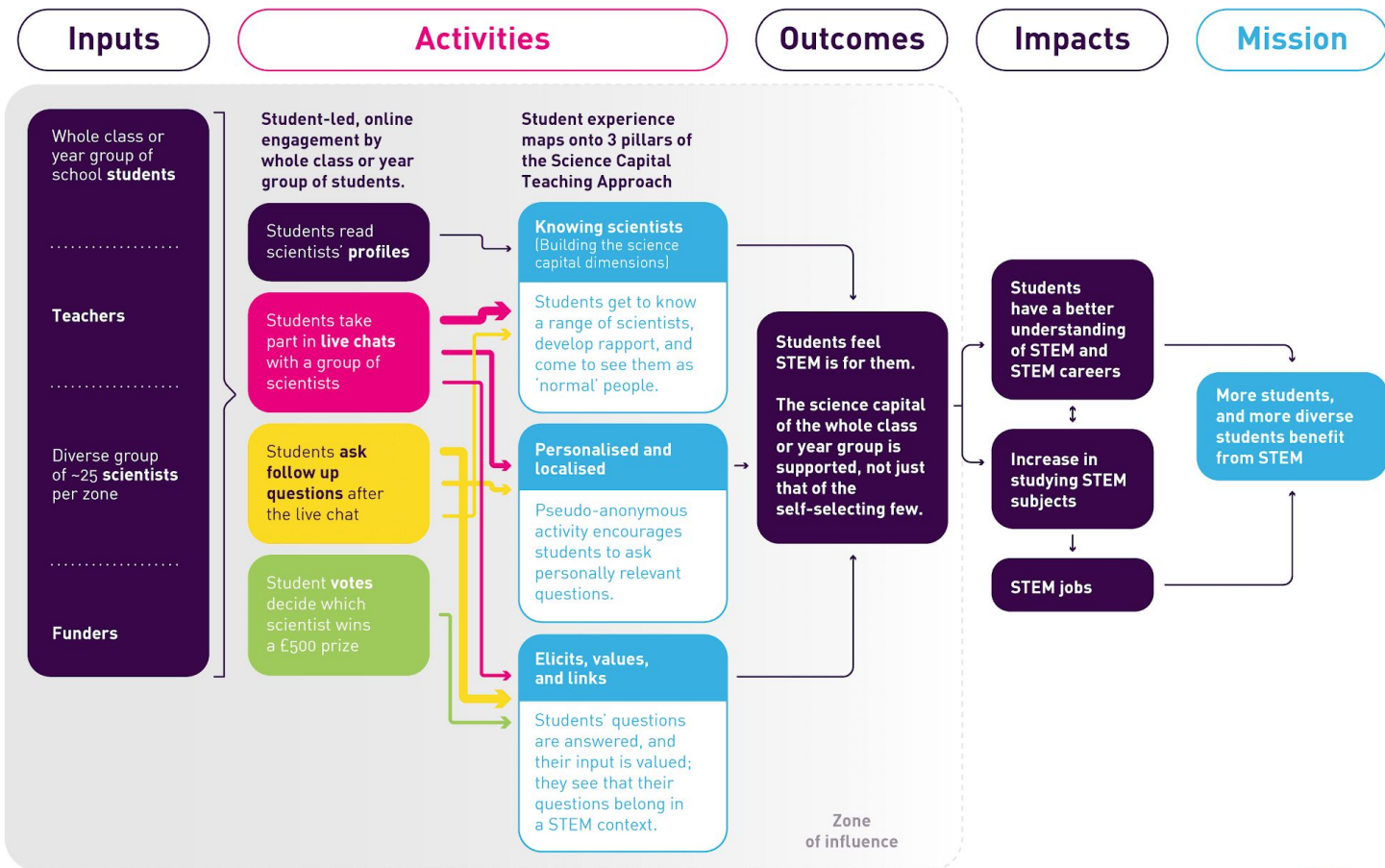


“

Many of our students lack confidence in their academic ability, so they were buzzing when they realised they can hold their own in a conversation with intelligent, educated people and this helped them realise they are all scientists too!



JULIE ANDERSON, TEACHER



Through engaging the whole class or year group with ~25 scientists from diverse backgrounds, different career pathways, and a wide range of fields in STEM, the diversity of young people who see STEM as something 'for them' increases.



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