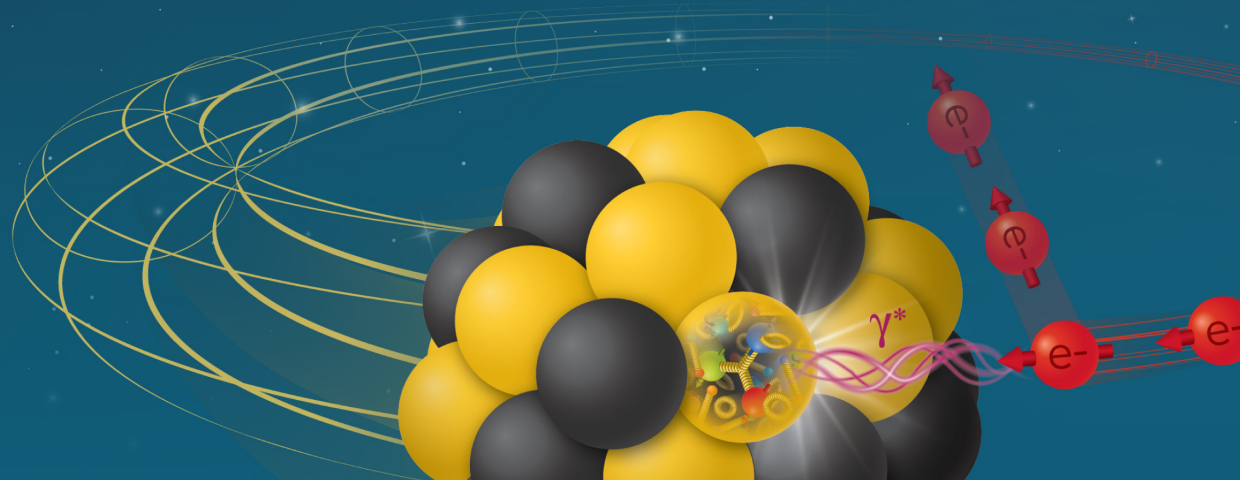


# Update on ePIC & EIC-UG Outreach WG

E.C. Aschenauer and M. Ruspa for the EIC-UG/ePIC Outreach WG

Joint ePIC/EICUG Meeting  
Glasgow, July 13<sup>th</sup> – 17<sup>th</sup>, 2026

Electron-Ion Collider



# Info on the ePIC&EIC-UG Outreach WG

## WG Members:

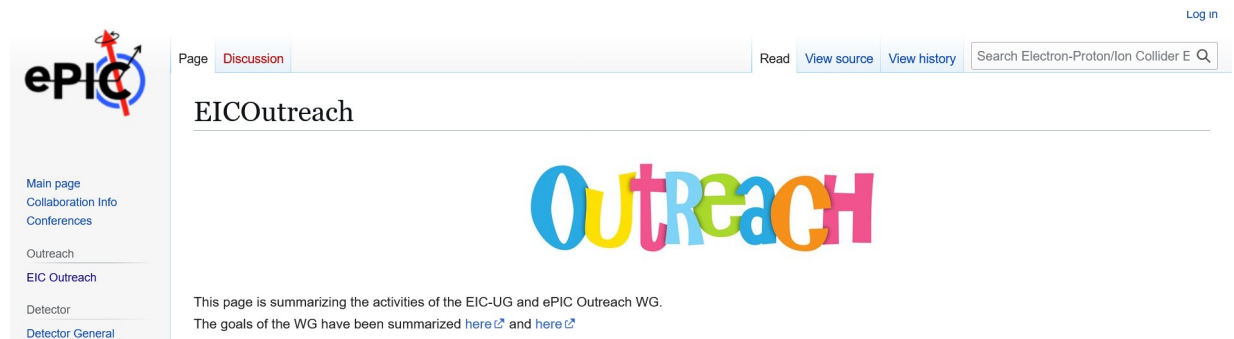
- Armenia: Dr. Hrachya Marukyan
- Czech Republic: Prof. Jana Bielikova
- France: Dr. Silvia Niccolai
- India: Prof. Md Nasim
- Israel: Prof. Zvi Citron
- Italy: Prof. Marta Ruspa  
Dr. Anna Maragno
- Japan: Dr. Masashai Kaneta
- Senegal Dr. Sokhna Bineta Amar
- Taiwan: Prof. Yi Yang
- UK: Prof. Rachel Montgomery
- USA: Elke-Caroline Aschenauer  
Amber Aponte  
and several early career members

**Email-list:** [eic-outreach-wg@lists.bnl.gov](mailto:eic-outreach-wg@lists.bnl.gov)

**Regular Meeting:** Biweekly Wednesdays  
8:15 am NY-Time

## Wiki-Page:

<https://wiki.bnl.gov/EPIC/index.php?title=EICOutreach>



**Everybody is welcome to the meetings, helping with activities**

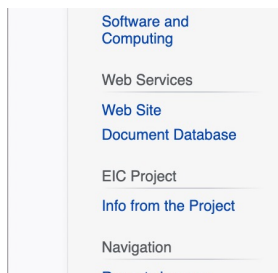
# The global goals of the WG

---

- Expand EIC experimental community
- Make the EIC a real international facility
- Spread EIC science to general public
- Built up a STEM pipeline
- Provide opportunities for early career scientist especially from developing countries
- Develop a truly diverse workforce

# Initiatives: collaboration contests

- **Poster contest**
- **Photo contest**



<https://wiki.bnl.gov/EPIC/index.php?title=EICOutreach>

## Finalized Activities:

### PHOTO CONTESTS:

- 4th Photo Contest during the January 2026 ePIC collaboration meeting, see photos here [4th Photo Contest](#)
- 3rd Photo Contest during the January 2026 ePIC collaboration meeting, see photos here [3rd Photo Contest](#)
- 2nd Photo Contest during the July 2025 EIC-UG - ePIC collaboration meeting see photos [here](#)
- 1st Photo Contest during the January 2025 ePIC collaboration meeting, see [see](#)

**Not only fun and people involvement but also way to collect**

- **images documenting these early years**
- **material for outreach**

**Everything available on our Wiki page**

<https://wiki.bnl.gov/EPIC/index.php?title=EICOutreach>



# Photo contest, 4<sup>th</sup> edition

**This meeting will host a new edition of the photo contest!**

Link to vote [https://wiki.bnl.gov/EPIC/index.php?title=4th\\_PhotoContest](https://wiki.bnl.gov/EPIC/index.php?title=4th_PhotoContest)

- Votes will be counted till Thursday 6:00 pm EST
- Please vote only once for your favorite photo
- The winners will be announced Friday before lunch
- For everybody attending in person in Glasgow all photos are printed and displayed in
  - foyer of Sir Charles Wilson Building (Mon, Tue, Fri)
  - the lunch and break space for Wed and Thur



**Happy voting and a big thank to all people contributing!**

# Poster contest, Early-Carrier edition

This meeting, during the Early Carrier session, has hosted a new edition of the poster contest!

The winner (already announced) was Sean



## VIRTUE: Virtual Interactive Reality Toolkit for Understanding the EIC

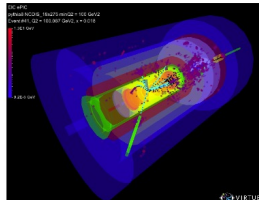
Sean Preins  
Interactive Event Display and Detector Visualization for the Electron-Ion Collider



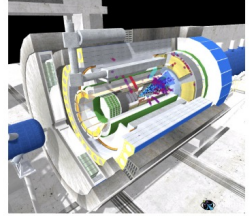
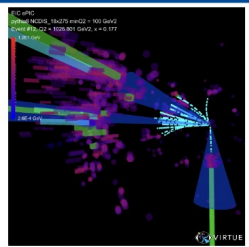
### VIRTUE Overview

VIRTUE is a standalone application for visualizing detector geometries and collision event data in an interactive three-dimensional environment. Developed in Unity, the software supports both conventional displays and immersive virtual reality platforms, providing a flexible framework for detector exploration, outreach activities, and educational demonstrations.

- Available for Windows, macOS, Linux, Android, and virtual reality platforms
- Includes engineering and simplified models of the ePIC detector
- Supports interactive navigation, detector inspection, and event animation
- Distributed through Steam, Google Play, and Zenodo



### Visualizing Collision Event Data



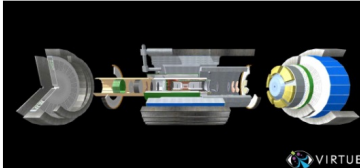
VIRTUE provides animated visualization of detector response and reconstructed event data within the detector geometry. Event information is displayed in three dimensions and can be explored interactively using playback controls and free camera movement.

- Supports visualization of tracks, hits, clusters, jets, and custom detector objects
- Event displays can be animated as a function of time
- Conversion tools are available for translating EDM4eic ROOT files into the VIRTUE JSON event format
- Users can navigate between events, adjust playback speed, and control viewing angles

### Visualizing Detector Geometry

VIRTUE supports the visualization of detector geometries ranging from detailed engineering models to simplified representations designed for clearer event visualization. Detector components can be viewed individually, made transparent, or hidden to expose internal subsystems and improve visibility of event data.

- Engineering detector models can be imported from standard FBX CAD files
- A custom JSON geometry format supports simplified detector representations
- Components can be labeled, isolated, and rendered with adjustable transparency
- Distributed with both engineering and simplified models of the ePIC detector



### Tour Mode

Tour Mode provides a guided presentation framework for detector systems and collision events. A tour consists of a sequence of scenes that control detector visibility, event selection, camera position, and explanatory text, allowing complex topics to be presented in a structured format.

- Individual scenes can focus on specific detector subsystems or physics signatures
- Camera positions and displayed components are configurable for each scene
- Tours are defined through JSON files and can be customized without modifying the application
- Includes a preconfigured tour introducing the major ePIC detector subsystems

### Applications

VIRTUE has been used as a visualization platform for outreach and educational demonstrations, and detector presentations. Its support for custom geometries and event data also makes it useful for illustrating detector concepts and simulated collision events.

- Outreach events and public demonstrations
- Classroom and student instruction
- Conference presentations and event visualizations
- Detector design and geometry exploration



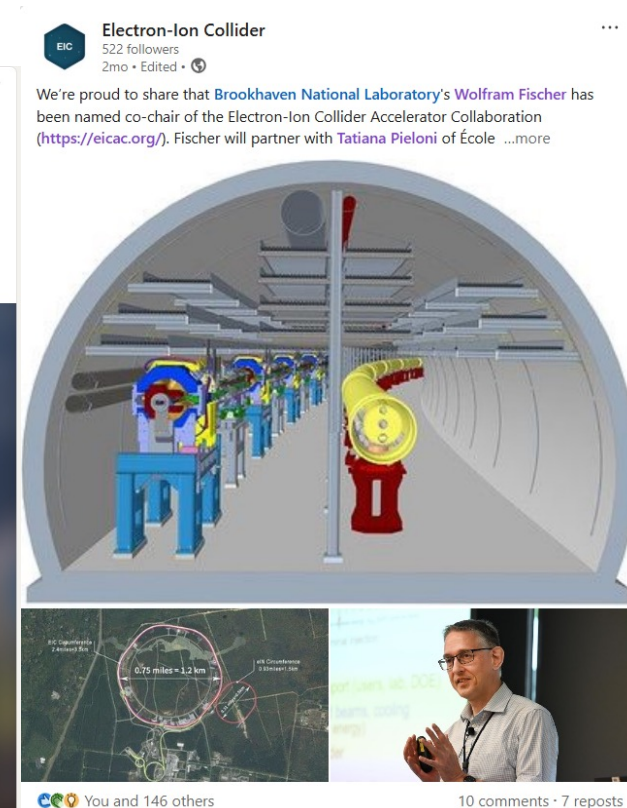
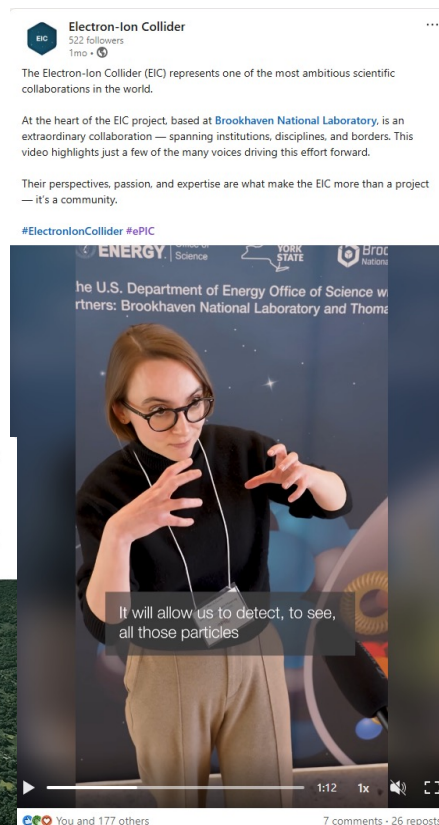
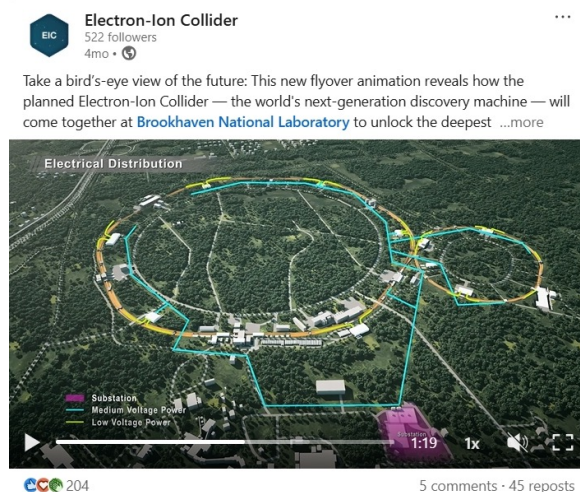
# Initiatives: social media presence





# LinkedIn BNL EIC

- Official page for the project, launched January 2026
- Latest developments
- Project milestones
- Staff profiles
- Leadership spotlight
- Technological advancements
- Partnerships and collaborations
- Multi-media
- Authentic



# LinkedIn ePIC Collaboration page



**ePIC Collaboration**  
ePIC is a collaboration of scientists and engineers aiming to understand the structure of the matter we are made of  
Research Services · 158 followers · 1K-5K employees

**ePIC Collaboration**  
158 followers  
4w · 🌐

What makes you excited about ePIC and the EIC?  
David Kapukchyan, who is attending the DIS2026 conference in Bologna (Italy), gives us his take on this



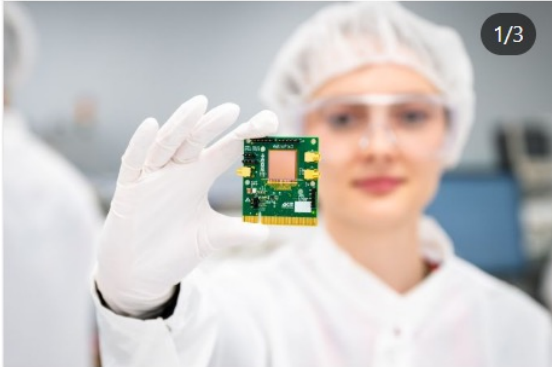
👍❤️🔗 15 · 2 reposts

## Page posts



**ePIC Collaboration**  
42 followers  
4d · 🌐

To all ePIC and EIC-Users Group Members: would you like to participate in a photo contest? Submit the coolest photo of the ePIC or EIC accelerator ...more

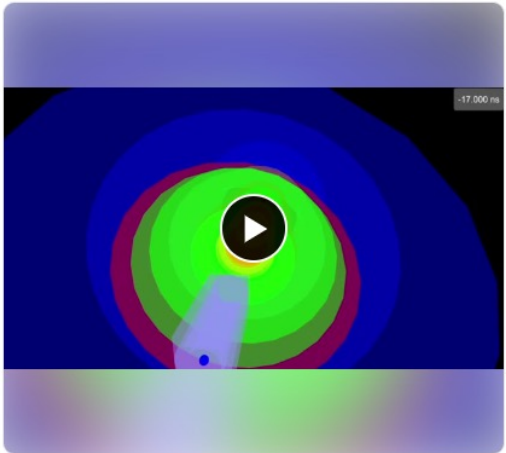


👍❤️🔗 2 · 1 repost



**ePIC Collaboration**  
42 followers  
6d · Edited · 🌐

Welcome to the ePIC Collaboration page! 🤖  
[#electronioncollider](#)

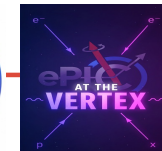


👍❤️🔗 9 · 1 repost

- **ePIC Collaboration, launched January 2026**  
<https://www.linkedin.com/company/epic-collaboration/>

# Early Career Group involvement

*Our Goals • Our Plan • How We Reach the World*



## Our Goal

- Make EIC science accessible to the general public
- Engage physics students, PhDs & researchers globally
- Highlight early-career researchers & diversity
- Build a lasting public narrative for the ePIC collaboration



## Podcast — ePIC Radio

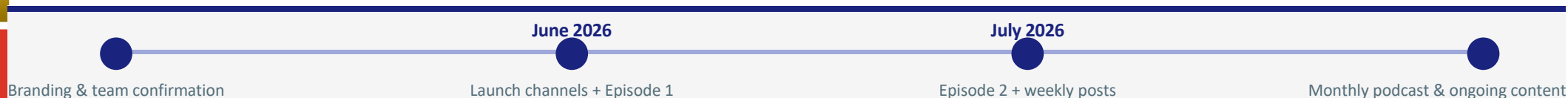
- Monthly episodes, 45–60 min, on YouTube
- Live broadcasts & interview-style recordings
- Topics: EIC history, detectors, physics & beyond
- Early-career spotlight & community discussions



## Social Media

- Short explainer reels — 30 sec to 1 min
- Detector series & physics topic series
- "Who We Are" videos + weekly Q&A
- Instagram, TikTok, YouTube & LinkedIn

**How we reach everyone:** YouTube • Instagram • TikTok • LinkedIn • Live Q&A • Country pages • Conference clips & interviews



Joint ePIC/EICUG Meeting, Glasgow, July 13<sup>th</sup> – 17<sup>th</sup>, 2026



# Ideas for (global) projects



# IPPOG and IMC

## Plan to join the International Particle Physics Outreach Group (IPPOG)

➤ a recognized pillar for HEP → integrated in European Strategy for Particle Physics

**2013:** Outreach and communication in particle physics should receive adequate funding and be recognized as a central component of the scientific activity. EUROPEAN PARTICLE PHYSICS COMMUNICATION NETWORK (EPPCN) and IPPOG should both report regularly to the Council



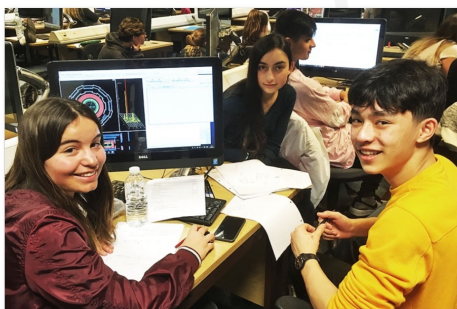
### Two related domains & groups

#### Communication: EPPCN

- Develop messages & strategies
- Optimise platforms & networks
- Create effective material

#### Education & Outreach: IPPOG

- Further develop **direct contact with public**
- Build trust in & understanding of scientific process
- Train the next generation of scientists
- **Share good practises across the community**



**EPPCN:** <https://espace.cern.ch/EPPCN-site/layouts/15/start.aspx#/EPPCN%20Web%20Page/Home.aspx>

**IPPOG:** <https://ippog.org>

**One of the main project in IPPOG are the International Master Classes (IMC)**



# International Master-Classes

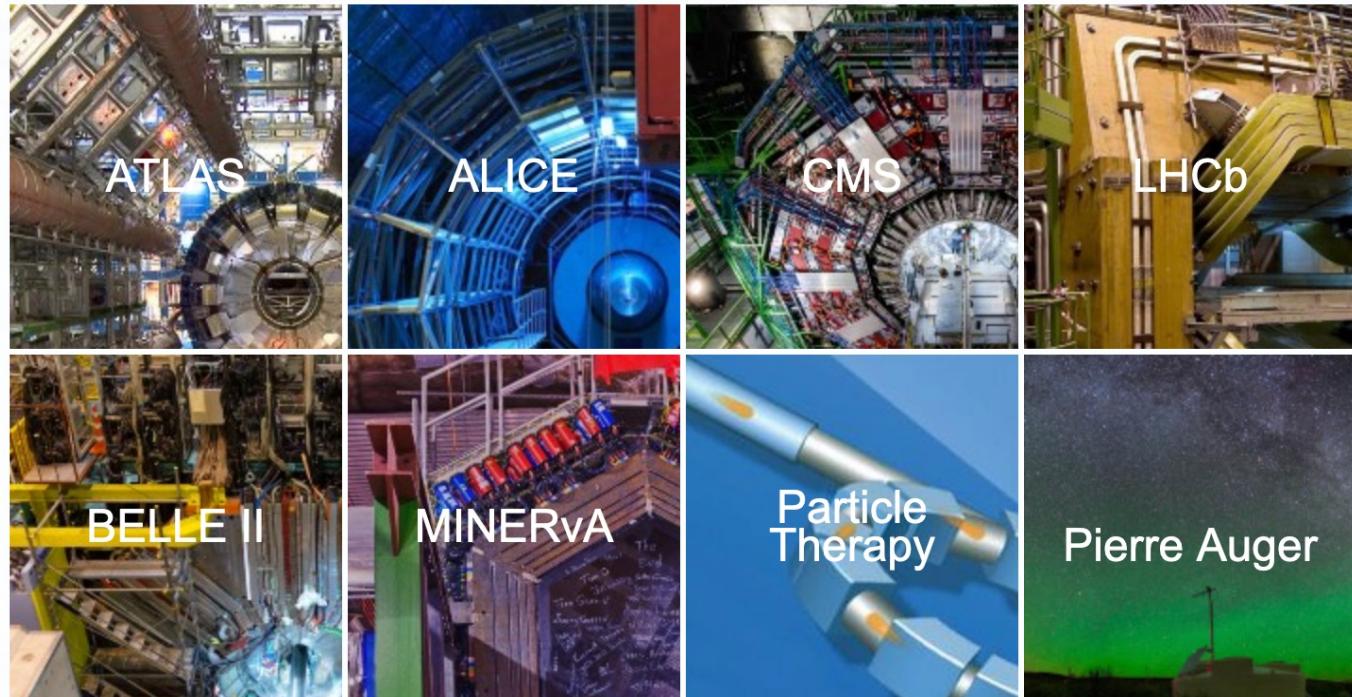
<https://physicsmasterclasses.org/>

Different topics related to various experiments

Each year

- 33000 high school students
- 60 countries
- 225 universities

The students attend a full day event in a nearby university



# Masterclass format

---

The Masterclass format is typically based on

- a few seminars on basic physics and on the concerned experiment in the morning
- a hands-on session in the afternoon
- a joint discussion of the results in video conference with all the participating institutes at the end of the day

The hands-on session is carried out on a desktop or laptop computer, ideally one for each student. A simulation/reconstruction software allows the students to perform an exercise – based on real or simulated data.

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# Technically/practically

---

We need

- all formalities with IPPOG, INFN, EPIC,...
- **exercises based on EPIC simulation/reconstruction** to be carried on with the students
- **framework easy-to-install on classroom desktop computers**



# Escape Rooms

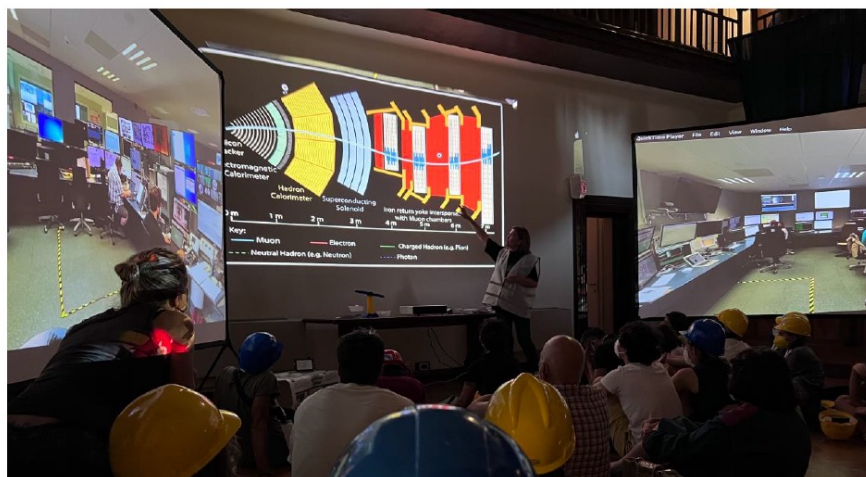


- An escape room is a treasure hunt indoor, with clues hidden in a room
- In principle people should be trapped in the room until they find all the clues and manage to open the door within a given time limit
- The clues are chained one after the other
- A facilitator can guide the team and help them to proceed if they are stuck
- Escape rooms have become popular among teenagers, as well as a team building exercise among co-workers

F. Cavallari  
LHCP 2024

3  
Escape Room in Science Education, e.g. [here](#)

# Escape Rooms



Bologna - ICHEP - 2023



Valle d'Aosta – in a school for La Thuile Conference - 2024



ERN - Roma - 2021

Adaptable to different locations



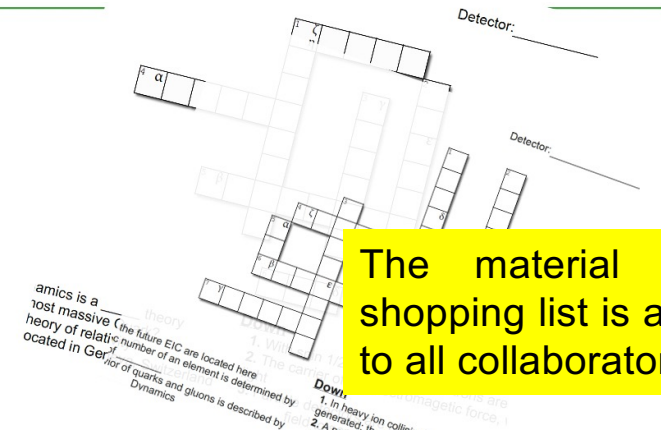
Frascati – OpenLabs -2023

11

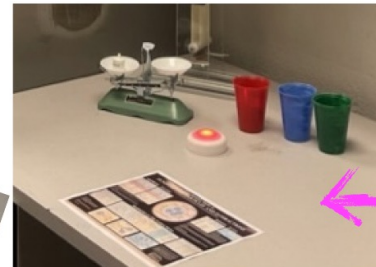
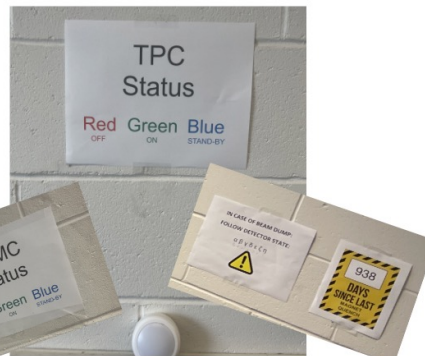
F. Cavallari  
LHCP 2024



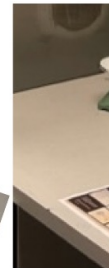
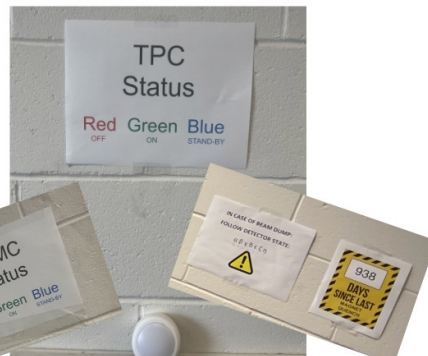
This week **BNL will feature the Escape Room originally developed by Yale University.** Congrats to Elke, Amber and the team and everybody else STAY TUNED



The material with a shopping list is available to all collaborators



This week **BNL will feature the Escape Room originally developed by Yale University** Congrats to Elke, Amber and the team and everybody else STAY TUNED



«Hands on» activities targeting people of all ages are more effective if based on

- platforms
- apps
- algorithms
- running code
- event display
- images
- ...





## VIRTUE: Virtual Interactive Reality Toolkit for Understanding the EIC

### User Guide V 3.0.0

Sean Preins  
University of California, Riverside

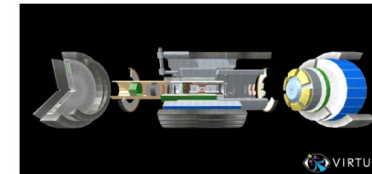
#### Preins

Visualization for the Electron-Ion Collider

#### Visualizing Detector Geometry

VIRTUE supports the visualization of detector geometries ranging from detailed engineering models to simplified representations designed for clearer event visualization. Detector components can be viewed individually, made transparent, or hidden to expose internal subsystems and improve visibility of event data.

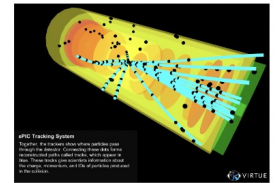
- Engineering detector models can be imported from standard FBX CAD files
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Tour Mode provides a guided presentation framework for detector systems and collision events. A tour consists of a sequence of scenes that control detector visibility, event selection, camera position, and explanatory text, allowing complex topics to be presented in a structured format.

- Individual scenes can focus on specific detector subsystems or physics signatures
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- Includes a preconfigured tour introducing the major ePIC detector subsystems



#### Applications

VIRTUE has been used as a visualization platform for outreach and educational demonstrations, and detector presentations. Its support for custom geometries and event data also makes it useful for illustrating detector concepts and simulated collision events.

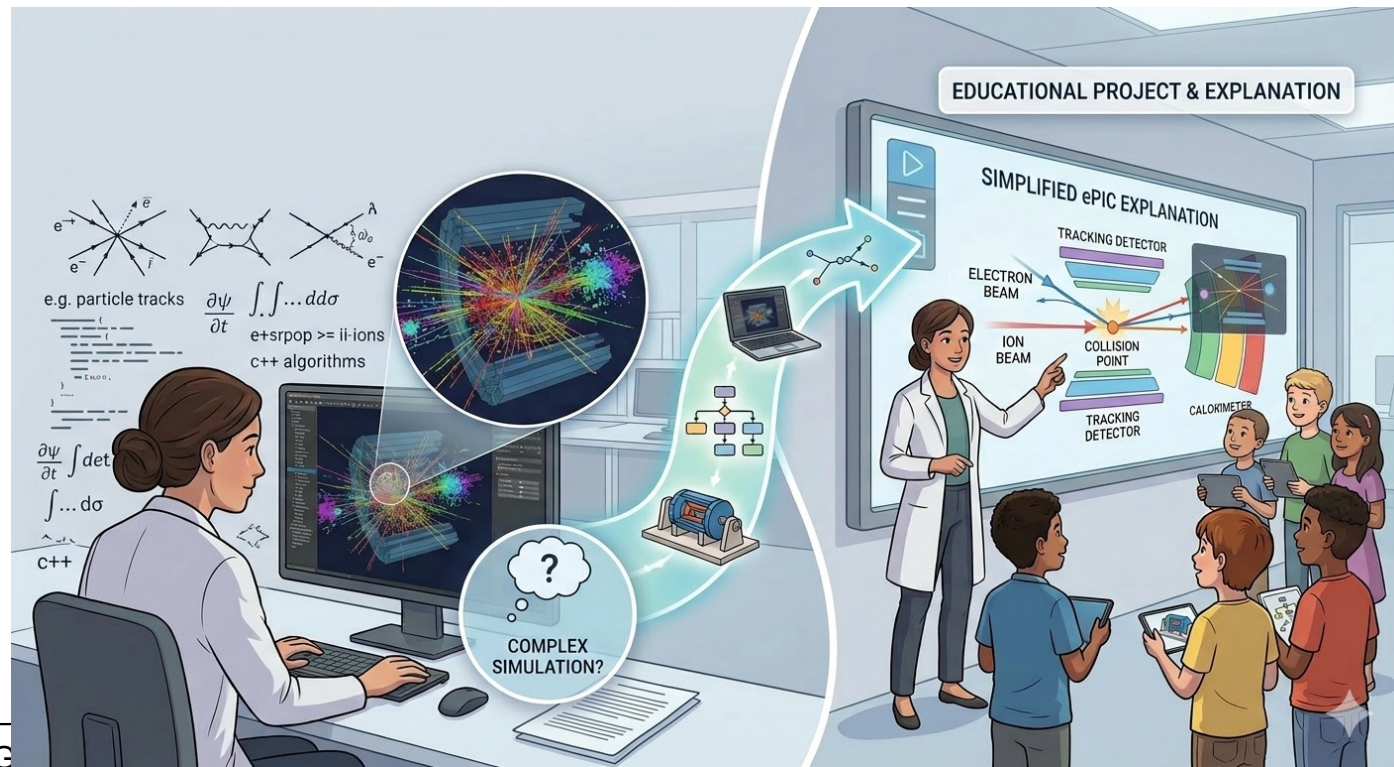
- Outreach events and public demonstrations
- Classroom and student instruction
- Conference presentations and event visualizations
- Detector design and geometry exploration



[https://indico.jlab.org/event/1067/contributions/19088/attachments/14396/23265/VIRTUE\\_User\\_Guide\\_V3\\_0\\_0.pdf](https://indico.jlab.org/event/1067/contributions/19088/attachments/14396/23265/VIRTUE_User_Guide_V3_0_0.pdf)

# Homework

While conducting a **physics analysis or simulation**, we can ask ourselves whether what we are developing could, with the necessary simplifications, become an **effective small-scale outreach project** to explain what will happen in an experiment like ePIC and what our work actually entails





# Existing activities at institute/national level



# Survey of existing activities

Suggested during last RBB meeting to take a second survey

s.google.com/forms/d/e/1FAIpQLScBL8BPAY2-kgbu2blvhrYAqX\_e6b660vEidaFvEw\_4oFF

COVID-19 – Doman... 10 scoperte scientif... INFN-Kids – La fisic... Siti nucleari – Arpa ...



## EIC-UG/ePIC Existing Outreach

Results of first survey [here](#)

Survey form structure:

- Institute \***  
Your answer
- Your name and e-mail address \***  
Your answer
- Other outreach materials or resources**  
(e.g. photos, posters, brochures, leaflets, public talk materials, demonstration activities/physical demonstration kits)  
Your answer
- Websites**  
(e.g. public outreach sections of universities, dedicated EIC related websites ...)  
Your answer
- Funding opportunities**  
(e.g. student projects/internships, scholarships, development)  
Your answer
- Social media accounts**  
(e.g. instagram, tik tok)  
Your answer
- Other outreach materials or resources**  
(e.g. photos, posters, brochures, leaflets, demonstration activities/physical demonstration kits)  
Your answer
- Any student learning materials or projects**  
(e.g. Summer schools, masterclasses)  
Your answer
- Other online media**  
(e.g. podcasts YouTube videos)  
Your answer
- Social media accounts**  
(e.g. instagram, tik tok)  
Your answer
- Other topics (e.g. not covered by above)**  
Your answer

Submit Clear form

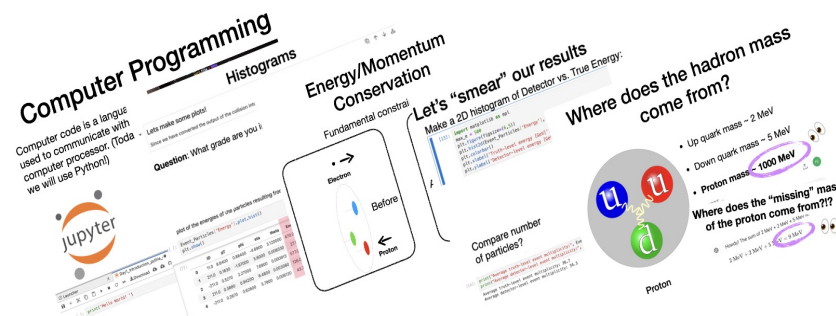


# Hands-on activities

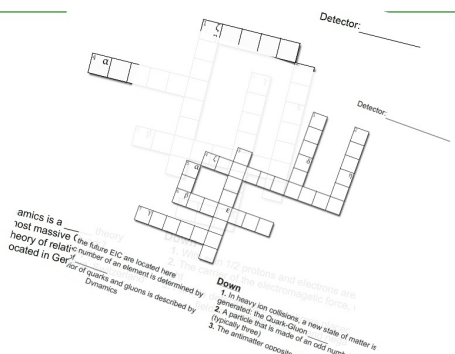
Interesting suggestion from Fernando Flor (Yale Univ)

<https://indico.jlab.org/event/855/sessions/2866/#20240722>

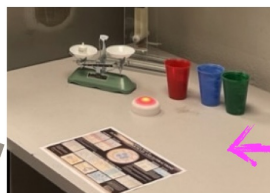
- «Let us smash some protons»  
exercize with Jupiter Notebook



- Escape room



In BNL this week,  
see a few slides earlier



# Videogames

Back

Quantum 3

<https://gamedev.msu.edu/quantum3/>

## TEAM

Huey-Wen Lin - Principal Investigator

Brian Winn - Executive Producer

William Jeffery - Producer

Tristan Özkan - Game Designer and Programmer

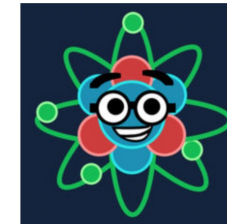
Harrison Sanders - Game Designer and Programmer

Rebecca Roman - Sound Designer

Roman Firestone - Artist

Colleen Little - Artist

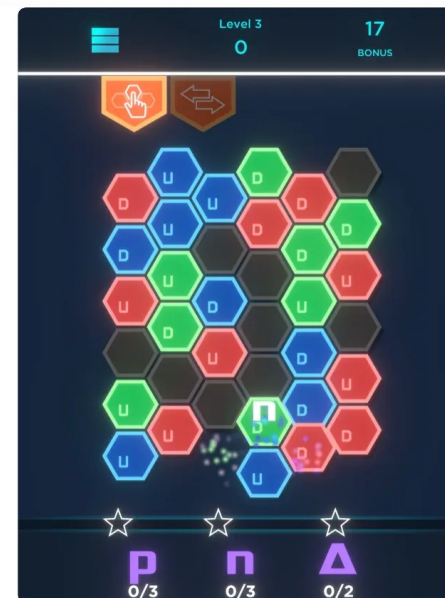
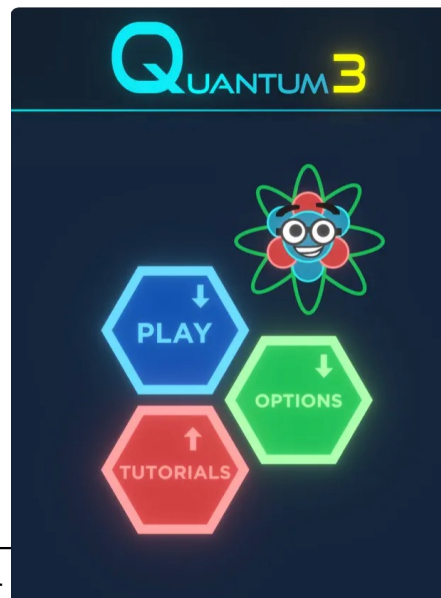
Release Date: January 2019



Quantum 3 is an educational match-3 game for all ages where fun meets quantum physics!

Build subatomic particles, learn about the mysteries of fundamental physics and deploy antimatter to clear the way! You'll match and swap quarks to make (and learn about) the baryons you need for each objective. Puzzle out the quantum properties of color, flavor and spin. So get in there and start your quantum-venture! Quantum 3 is puzzle-matching at its finest and a great intro to the world of particle physics!

## SCREENSHOTS



Joint ePIC/EICUG Meeting, Glasgow, July 13<sup>th</sup> –

# Podcasts



**STRONG  
INTERACTIONS**

**STORIES STRAIGHT FROM  
THE HEART OF MATTER**

[Home](#) [About](#) [Feedback](#) [Episodes](#) [Guests](#)

**Strong Interactions** is a podcast about exploring a new frontier in nuclear physics at the upcoming Electron-Ion Collider, by Maria Żurek and Markus Diefenthaler.

LISTEN ON  Spotify

 Listen on Apple Podcasts

Listen on  amazon music

Strong Interactions PodBean



# Videos (just examples, there are many more)

---

<https://www.youtube.com/watch?v=H8Mqj3K66cU>

ePIC animation

<https://www.youtube.com/watch?v=ach9JLGs2Yc>

Visualizing the Nucleus

<https://www.youtube.com/watch?v=e2FrALuacZ4&t=6s>

Visualizing the Proton: A Documentary

<https://www.youtube.com/watch?v=G-9l0buDi4s&t=745s>

Visualizing the Proton

<https://www.linkedin.com/feed/update/urn:li:activity:7453099404091289600>

BNL Linkedin project

# Student training

## Binding Blocks in UK

- Nuclear physics outreach collaboration in UK led and coordinated by University of York
- Run yearly online nuclear physics masterclasses for high school students
- In addition to curriculum related material, masterclasses are research-led, they involve researchers and research topics
  - e.g. webinars, research-led modules (eg “particle physics meets nuclear physics” module)
- Would be great to get EIC embedded in these masterclasses
- Binding Blocks have STFC funding. Can help support people getting involved (eg materials production, travel)
- In the past (from University of Glasgow personal experience) we partook in masterclasses via development of “particle physics meets nuclear physics” module, live webinars about our research, and creating pre-recorded videos with PhD students discussing their research in Mainz and JLab or on strong force topics
- e.g. PhD student videos (<https://www.youtube.com/watch?v=KfB-eU9HUjg> and [https://www.youtube.com/watch?v=nf\\_sZVCnugI](https://www.youtube.com/watch?v=nf_sZVCnugI))
- Other UK institutions have also joined with similar activities

# Student training

Join the **Binding Blocks** team to explore cutting-edge research in nuclear physics.

- 6 week programme with 3-5 hours content per week.
- Work at your own pace, in the classroom or at home.
- Weekly live webinars with leading experts from around the world.
- Get help and find out more through an online question forum.
- Complete all activities to receive a Certificate of Participation, awarded by the **University of York**.

This programme is suitable for students aged 16-19 studying Physics (AS or A Levels, IB, Highers or Advanced Highers, or equivalent).

## Module 1: Energy and Decay

Explore the Nuclear Chart, showing all the isotopes discovered so far. Refresh your understanding of the different decay types, follow nuclear decay chains, explore the concept and applications of binding energy, and investigate half-lives. This first module will give you all the building blocks you need to explore Nuclear Physics in more detail.

## Module 2: Experimental Nuclear Physics

From historic experiments that revealed the structure of the atom, to cutting-edge detectors and particle accelerators, in this module you'll explore how discoveries in Nuclear Physics have been made, and get a glimpse of some of the exciting research that's currently being undertaken around the world. Take part in virtual tours of National Laboratories, find out about underground research facilities, and investigate detector science through online simulations.

## Module 3: Nuclear Astrophysics

Investigate the life cycle of stars - from fusion taking place in main sequence stars, to the nuclear reactions happening during stellar explosions. Discover the origins of the elements and find out about the roles of different isotopes in these processes. Investigate a model of the nucleus using an interactive simulation, and use this to explore the size and density of neutron stars.

## Module 4: Fusion Technology

In this module we bring nuclear fusion, the process that powers the stars, down to Earth. Find out about this potential method of power generation that could solve the energy crisis. From tokamaks to laser-driven fusion, discover the interface between nuclear and plasma physics and explore the devices being used to create temperatures more than ten times hotter than the centre of the Sun.

## Module 5: Medical Physics

Explore Nuclear Medicine - from imaging techniques to treatment of diseases such as cancer. Discover what medical physicists do; find out how PET scanners work, and how quantum entanglement can make these more effective; and use computer modelling to investigate proton-beam therapy and optimise treatment.

## Module 6: Particle Physics meets Nuclear Physics

This is an opportunity to delve inside the nucleus. Protons and neutrons are both examples of hadrons - particles that are composed of quarks and therefore feel the strong force. In this module, discover some of the more exotic quark combinations and newly discovered particles that may give us the answer to questions such as 'What is dark matter?'.

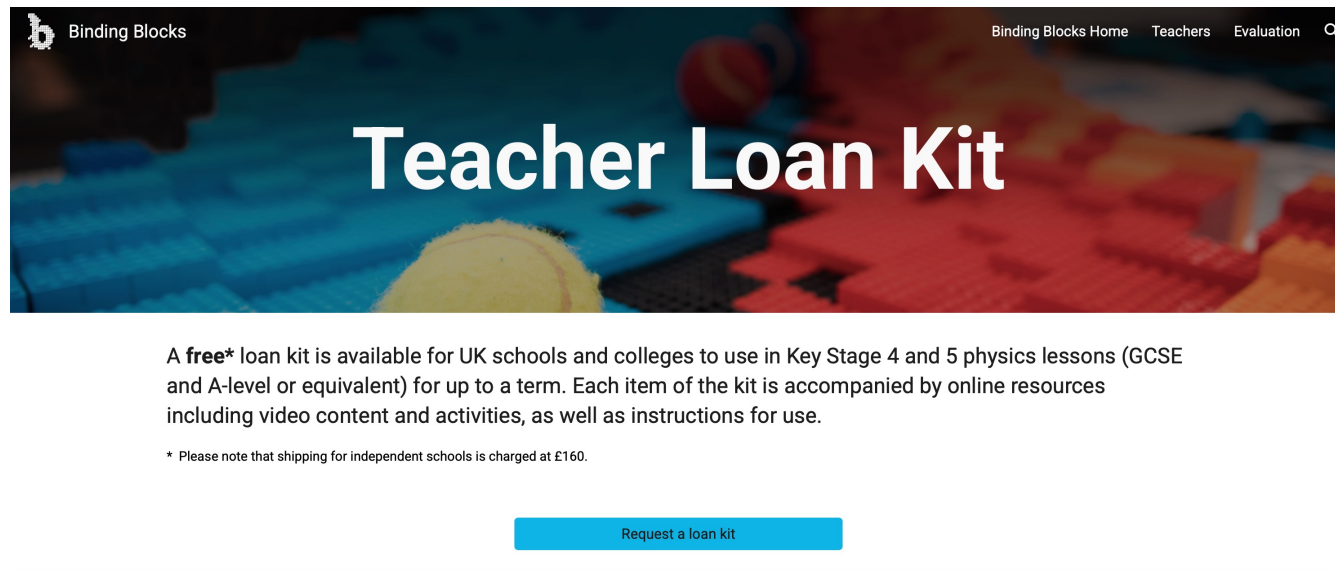
- Online masterclasses:
- Pre-16 masterclass  
[https://isaacscience.org/events/2503\\_pre16\\_bindingblocks](https://isaacscience.org/events/2503_pre16_bindingblocks)
- Post-16 masterclass  
[https://isaacscience.org/events/2503\\_post16\\_bindingblocks](https://isaacscience.org/events/2503_post16_bindingblocks)
- Students get certificate from University of York after completion

**It would be great to get EIC embedded within this module**



# Teacher training

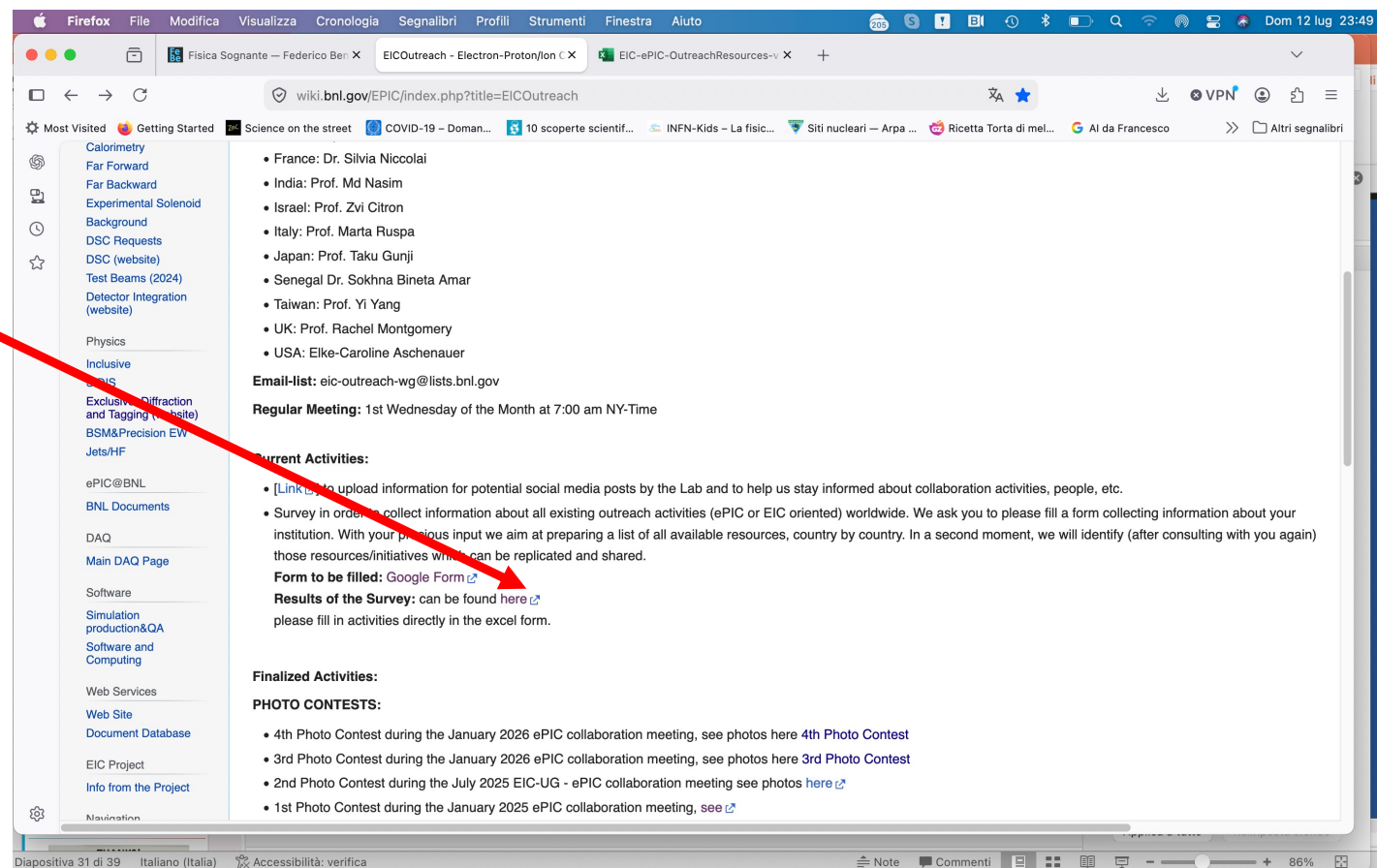
- **Teacher loan kits:** <https://sites.google.com/york.ac.uk/bindingblocks/teachers/loan-kit>
- We developed a couple of these kits in Glasgow (particle scattering kit and cloud chamber) and there are others available too
- Schools can request kits to be sent to them, teachers can also attend teacher training events if they want to - but kits are all self explanatory with accompanying video content explaining how to use them
- Only in England currently - would be nice to expand to other countries/remote places far from Universities (eg highlands and islands)



# Get inspired!

More inspiring initiatives  
available in our Wiki page  
[https://wiki.bnl.gov/EPIC/index.  
php?title=EICOutreach](https://wiki.bnl.gov/EPIC/index.php?title=EICOutreach)

Contact us for infos/help

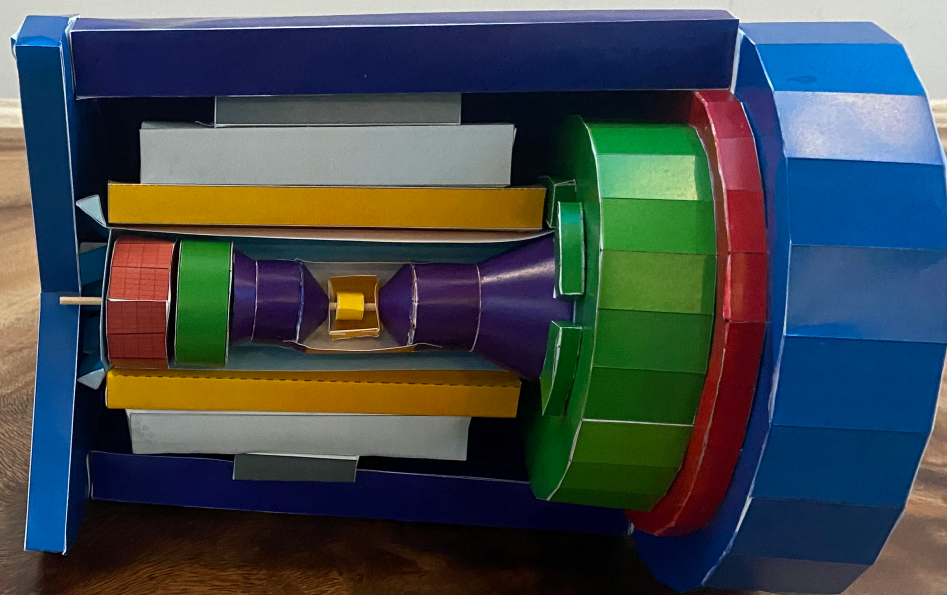


# THANKS!

Prototipo di papercraft

Modellino da stampare,  
ritagliare e montare

Per info: [tiziano.virgili@sa.infn.it](mailto:tiziano.virgili@sa.infn.it)





# BNL

- BNL Summer Sundays “Fascinating Physics”: EIC Open House - August 2026
- “Let’s Smash the Proton” session for high schoolers – July 2026
  - “Escape the Control Room” activity (based on Yale Pathways Summer Scholars Program)
- BNL PubSci event: “The Secrets of Matter: Journey to the Electron-Ion Collider”





# Israel

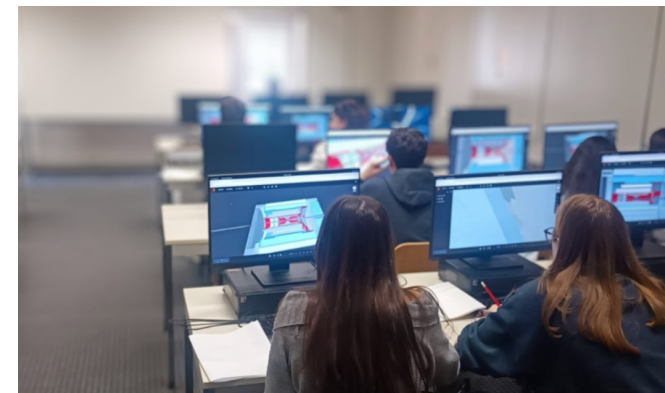
- In our outreach goals we target two distinct audiences
  - General population w/some interest in science
    - Raise awareness of the science's very existence
    - Share progress and even one day results with broad audience
    - Aim to build support for long-term participation (and nuclear physics in general)
  - Young people ages ~12-25
    - Raise interest in science generally w/nuclear & EIC interest as best case
    - Aim to inspire people to study science/physics/nuclear
- Activities
  - Instagram – building up media “bank” scheduled to go live mid-June (!)
  - High school direct outreach – starting discussions/coordination for talks to high school students (summer vacation probably pushes schedule to Fall)
- Group
  - So far, we are 1 PI, Zvi, and 2 UG students, Kfir and Guy, at BGU working on this



Screenshot from Instagram 'carousel'

# Italy

- **Instagram:** [https://www.instagram.com/epic\\_italia?igsh=MWoyYzR1OG9tMWNwNw%3D%3D&utm\\_source=qr](https://www.instagram.com/epic_italia?igsh=MWoyYzR1OG9tMWNwNw%3D%3D&utm_source=qr)
- **Web site** <https://eic-it.infn.it/> , **Mailing list** [epic-italia-outreach@lists.infn.it](mailto:epic-italia-outreach@lists.infn.it)
- **Events for schools**
  - «Ti presento ePIC» (high schools),  
*Introduction to the ePIC physics and experiment*, held in several INFN sites <https://agenda.infn.it/category/2222/>
  - Hands-on «pilot» event (high schools) *in preparation of a future Masterclass* <https://agenda.infn.it/event/51776/>
  - Event for 10-13 aged students
- 2 satellite events (to PD2025 and DIS26) for **kids and families**



- **Exhibition** of ePIC «cards»  
(collection of Instagram carousels)



# What is needed

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