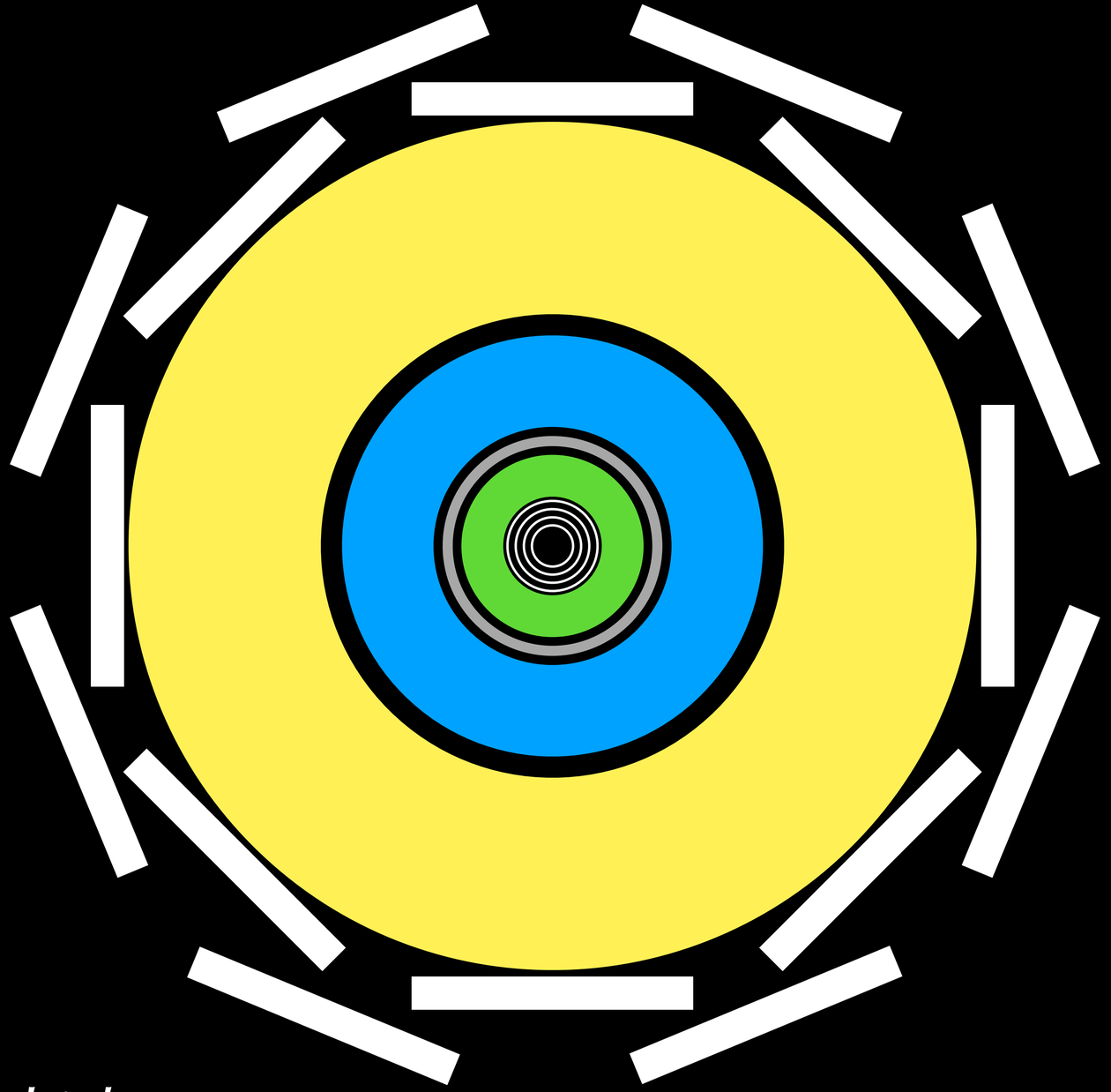
ICHEP 2022
BOLOGNA

Particle Physics for Babies

Outreach for the youngest audiences



Louie Corpe (CERN)

Outreach round table

activities for young audiences and kids

Particle Physics... for babies?!

- Concept came in late 2020 when I became a father
- How to ***share my passion with newborn daughter***?
- Communicate particle physics **with no words at all**?
- **Babies love bold, high-contrast images:**
  helps **develop focus and eyesight**... but most books on market are boring arrays of dots, circles, lines...
- *Yet oddly familiar to a particle physicist...*
  - *We have a plethora of fascinating visuals:*
    Feynman diagrams, event displays...
- **Put 2 and 2 together and book was born!**

Some history

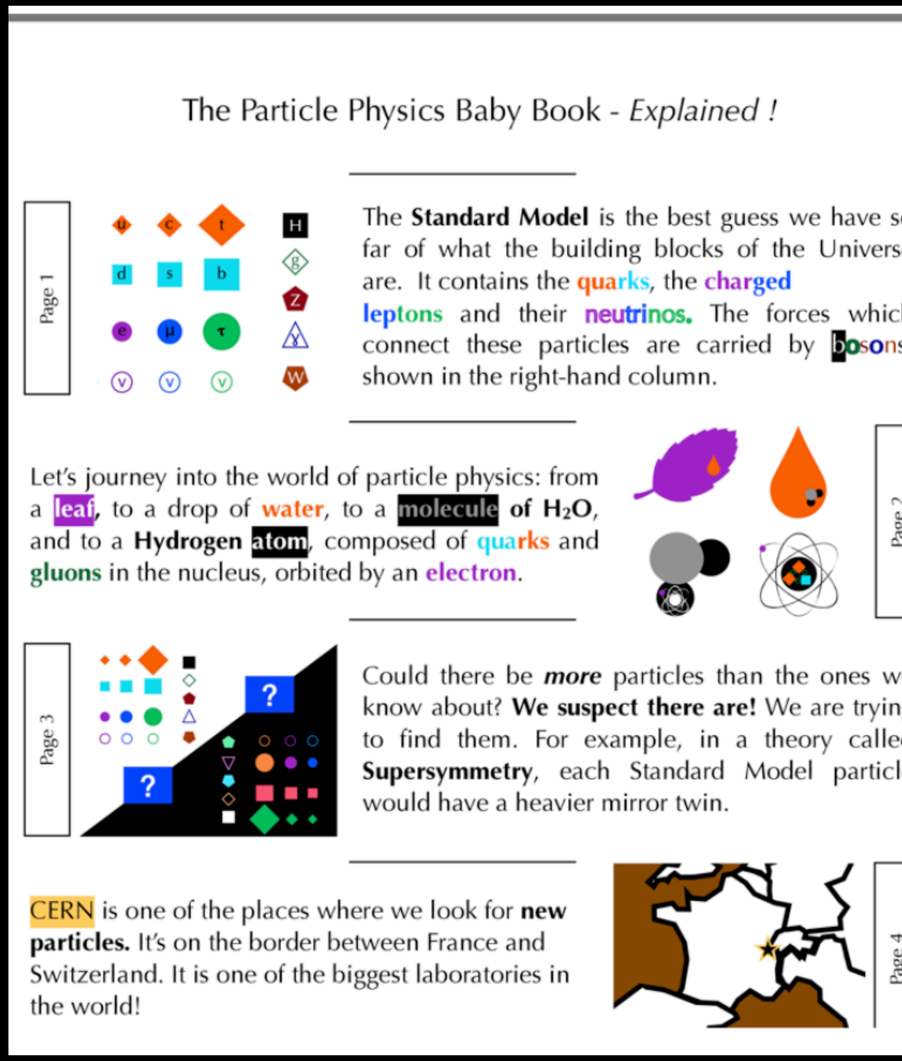
- Created artwork on last day of parental leave. **My daughter loved the prototype!**

- More and more friends (physics and non-physics alike) requested copies, **realised outreach potential of book**.

- ATLAS Outreach coordinators and IPPOG helped develop and refine the concept, connect with other outreach content creators, find funding and contact with eg CERN store

What is the target audience?

- **Downloadable captions** allow us to reach two audiences for the price of one:
  - **Babies: science as part of universe from day zero**. Demystify science, part of everyday conversation. Addresses them directly as the scientists of tomorrow
  - **Parents, friends and family:** learn about the LHC while reading them the captions!
    - Best way to learn something is to explain it to someone else!
- Almost everybody knows *somebody* who is expecting a baby. **Unique and quirky present, which allows us to reach a whole new set of audiences**



What's the status?

- A sleep-deprived idea has ballooned into an incredible project, thanks to the help and support of IPPOG and the ATLAS Outreach coordinators
- First run of book is currently in the printing presses! To be delivered at CERN by end of July.
- Book released under Creative Commons BY-NC-SA 4.0 license. PDFs + captions downloadable for free
- ISBN registered. CE / UKCA certification.
- Project co-funded by IPPOG/ATLAS Outreach.
- Will be available from:
  - CERN gift store
  - ATLAS secretariat
  - louiecorpe.com

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Thank you!

(See next slides for full book)

Grow your own genius with your baby's first foray into the colourful and intriguing world of particle physics. Watch them discover quarks, leptons and bosons, the Large Hadron Collider, particle detectors and collisions at the speed of light. The book comes with downloadable captions and so you can share the secrets of the universe with authority.

Developed and produced with the kind support of ATLAS and IPPOG

ATLAS EXPERIMENT

International Particle Physics Outreach Group

CE UKCA

For more information and explanations, visit louiecorpe.com/pp4b

Scan me for captions!

To Nora, thank you for being the inspiration for this book.

ISBN 978-1-3999-2108-4 UK£10.00

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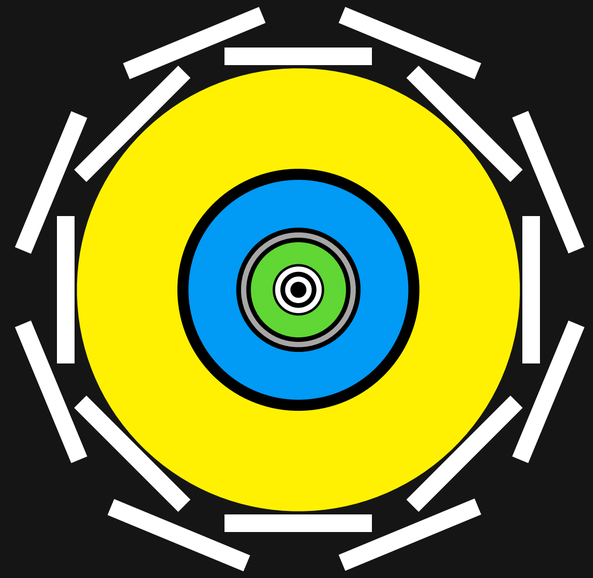
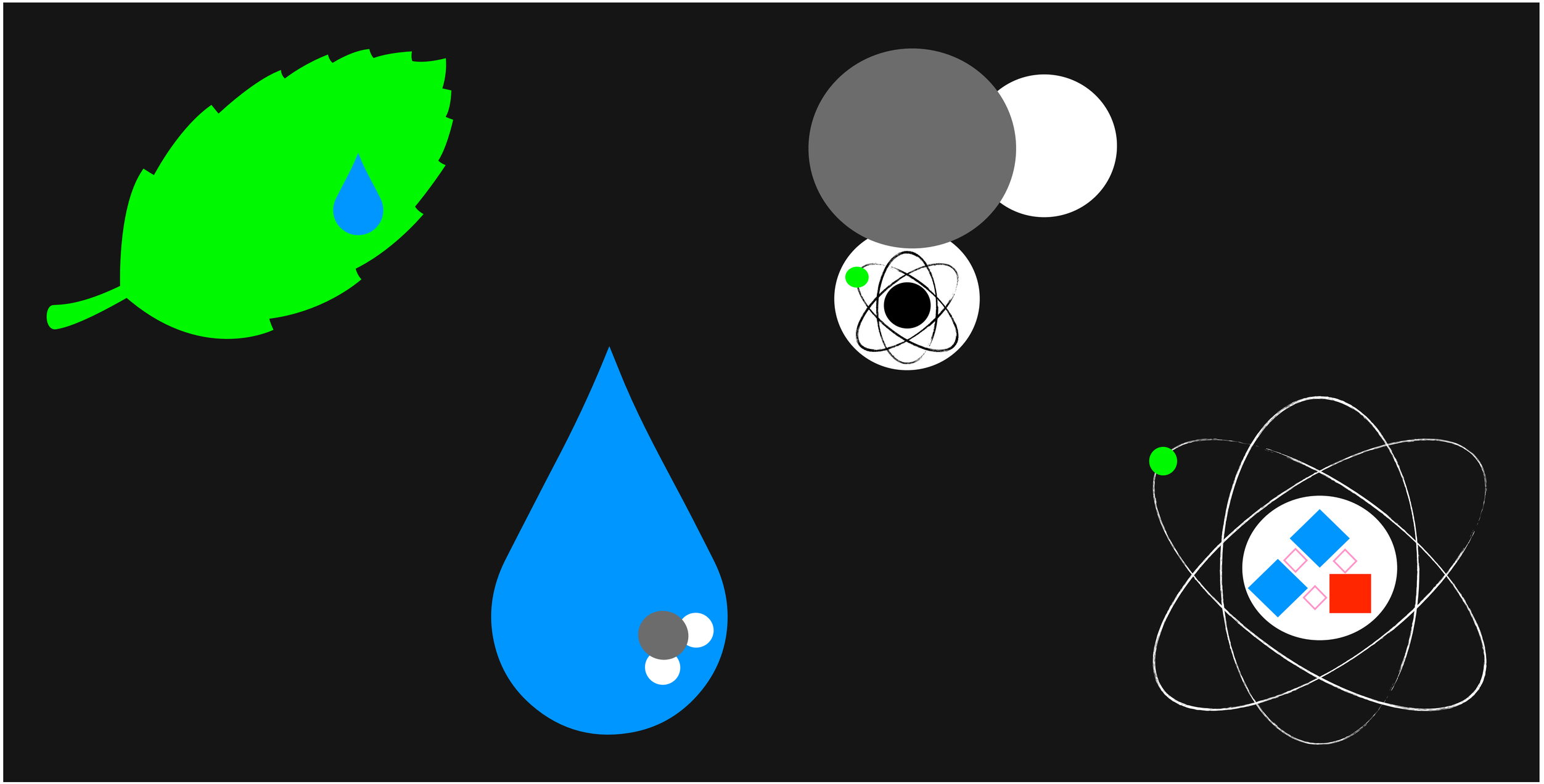
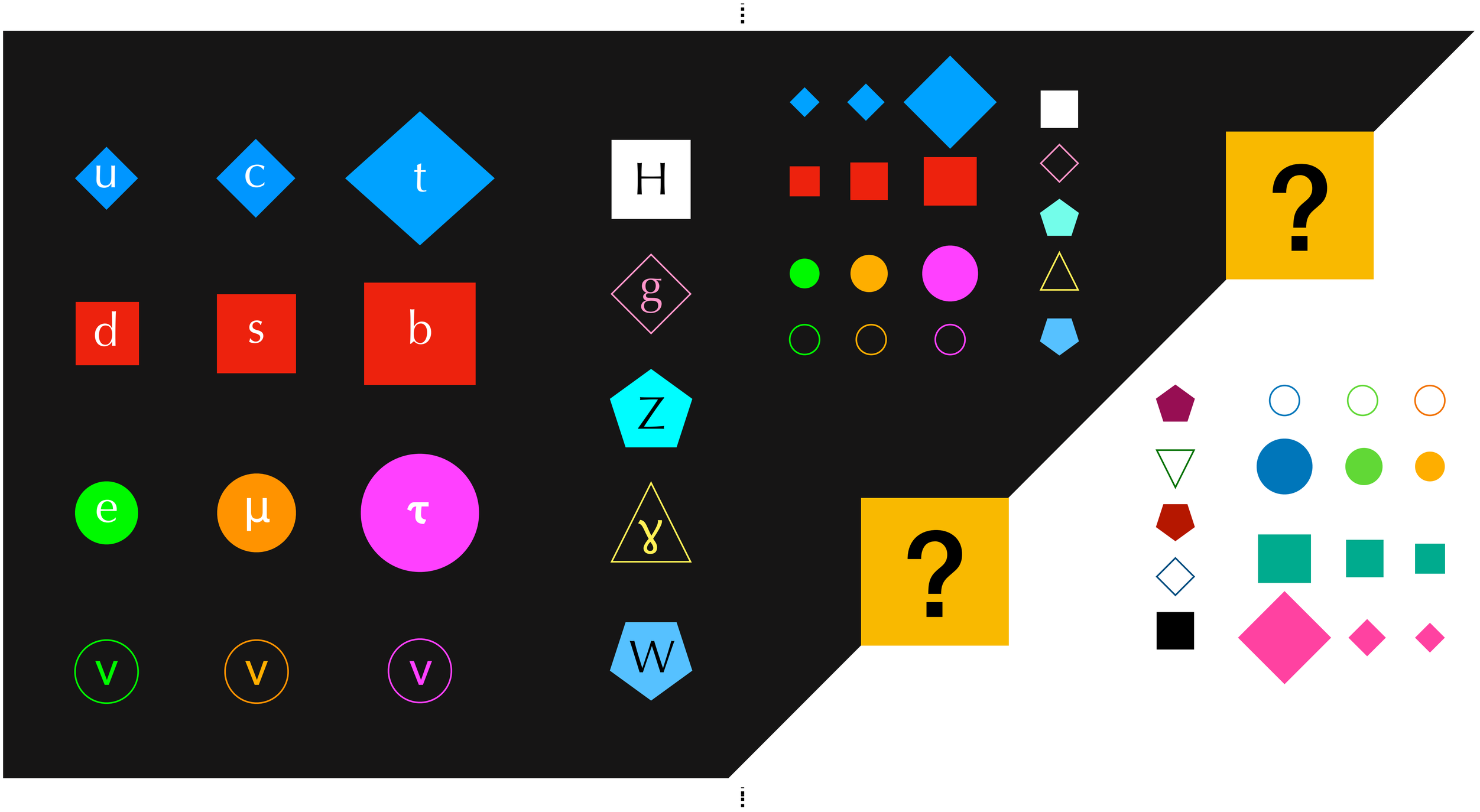
Particle Physics for Babies Dr Louie Corpe

Particle Physics for Babies



By Dr Louie Corpe

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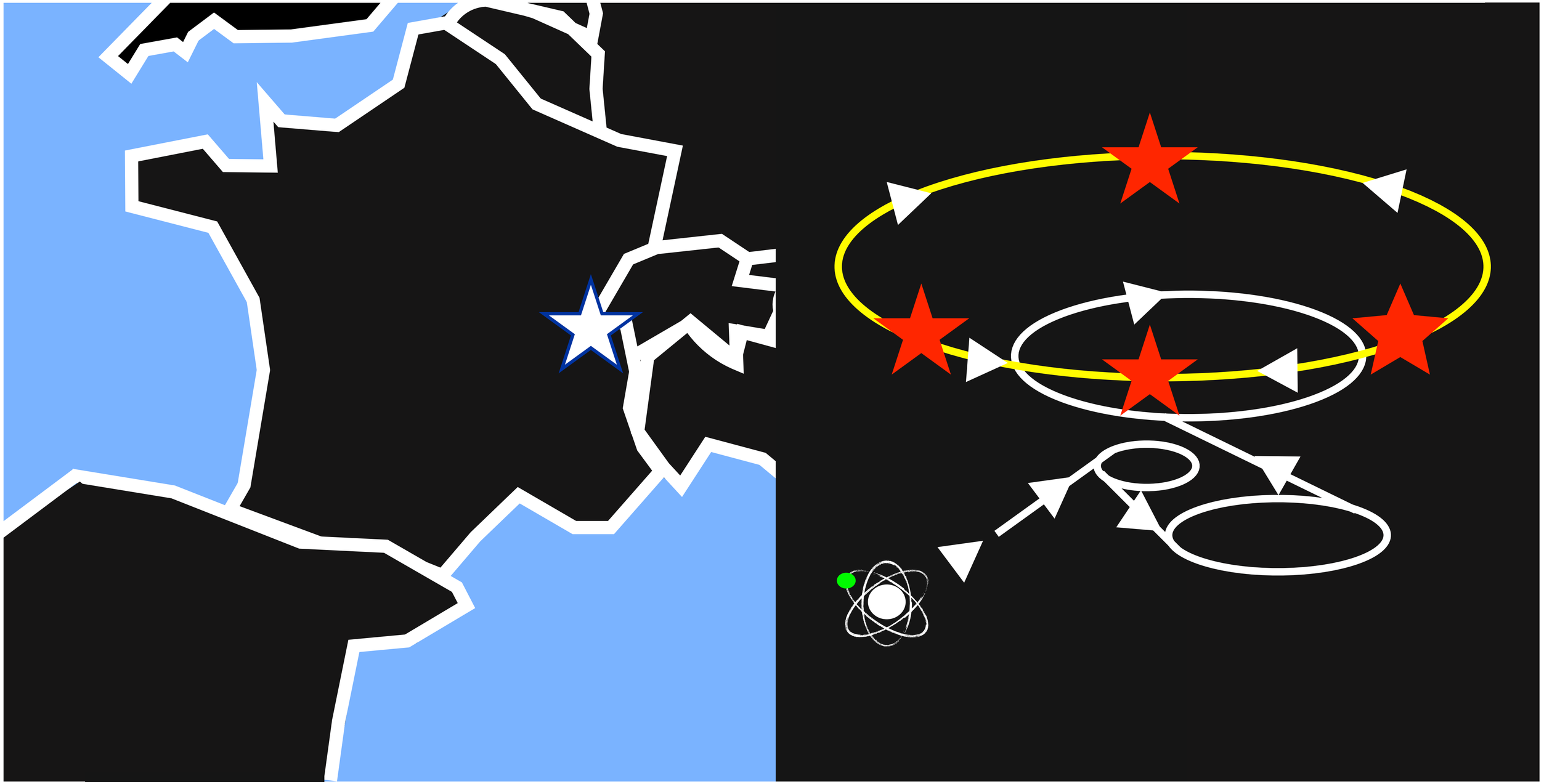

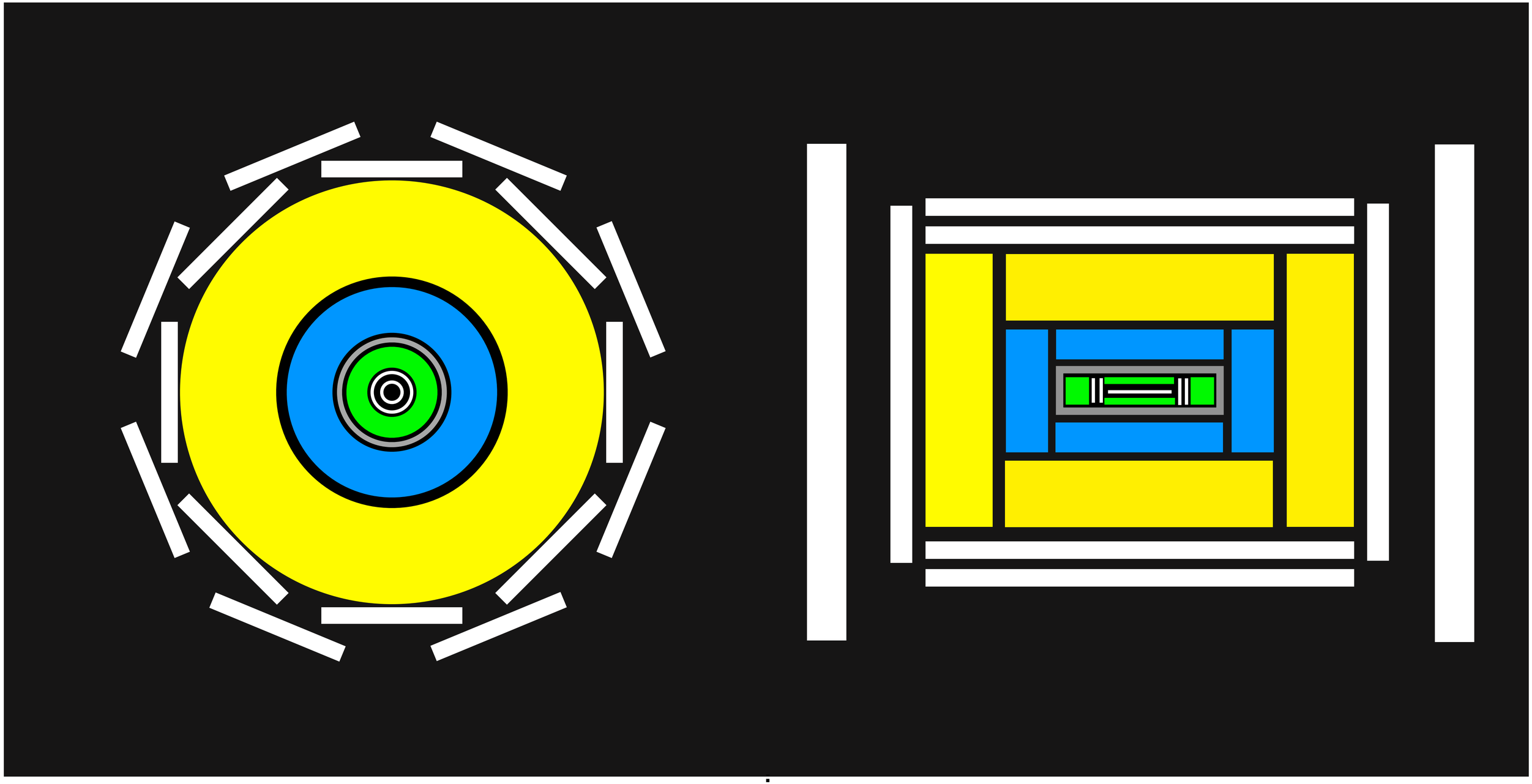

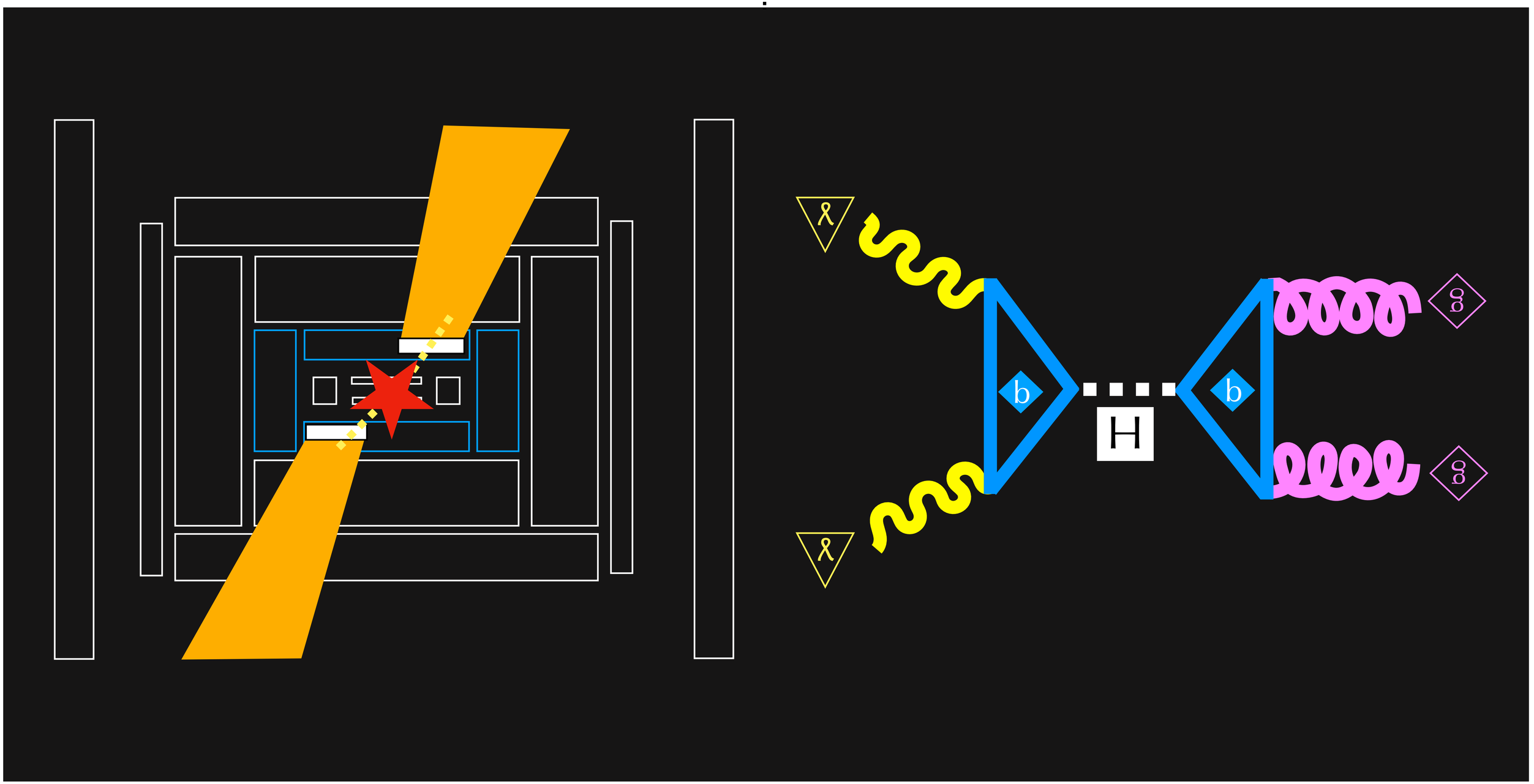
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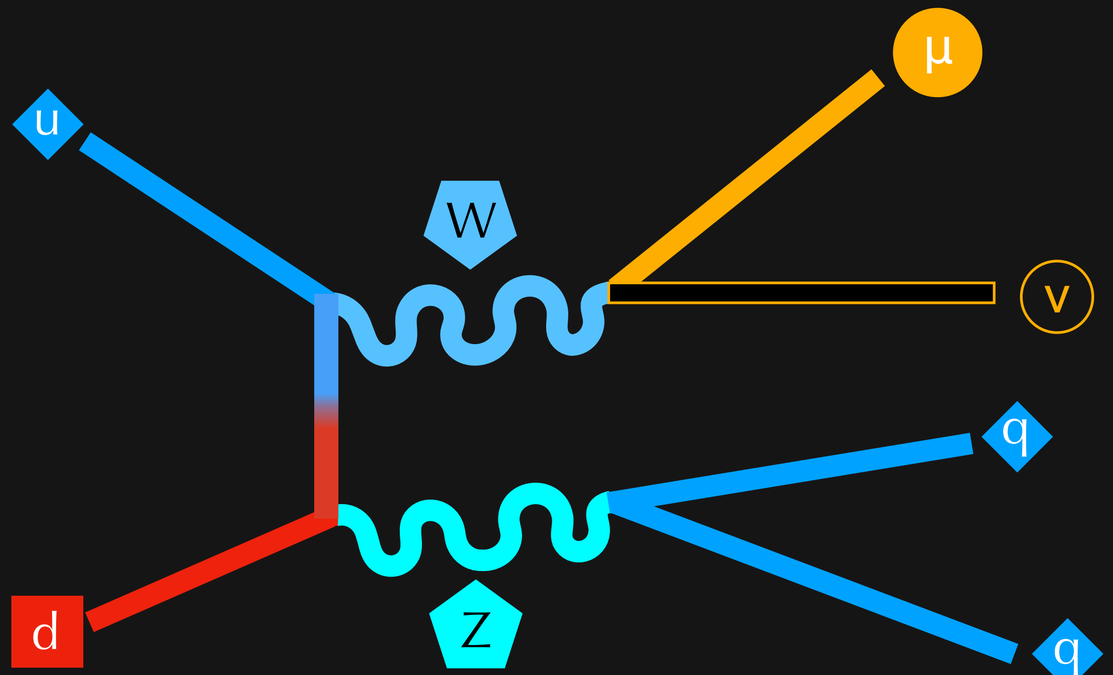
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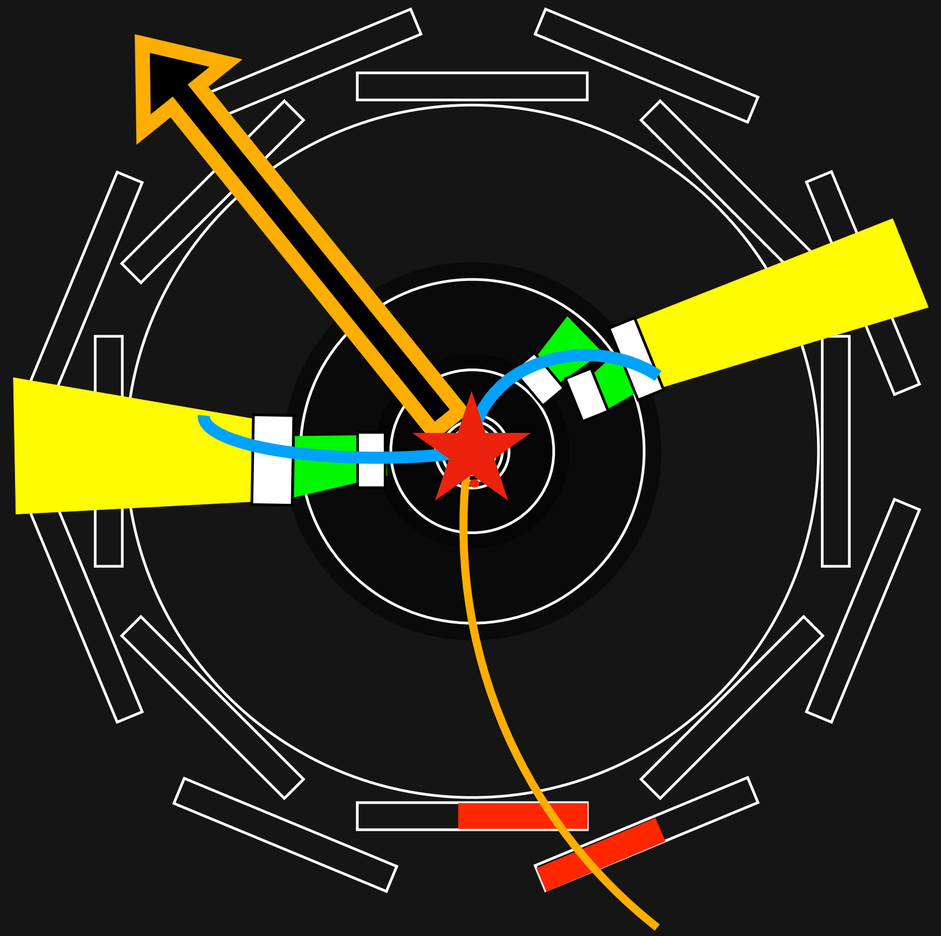

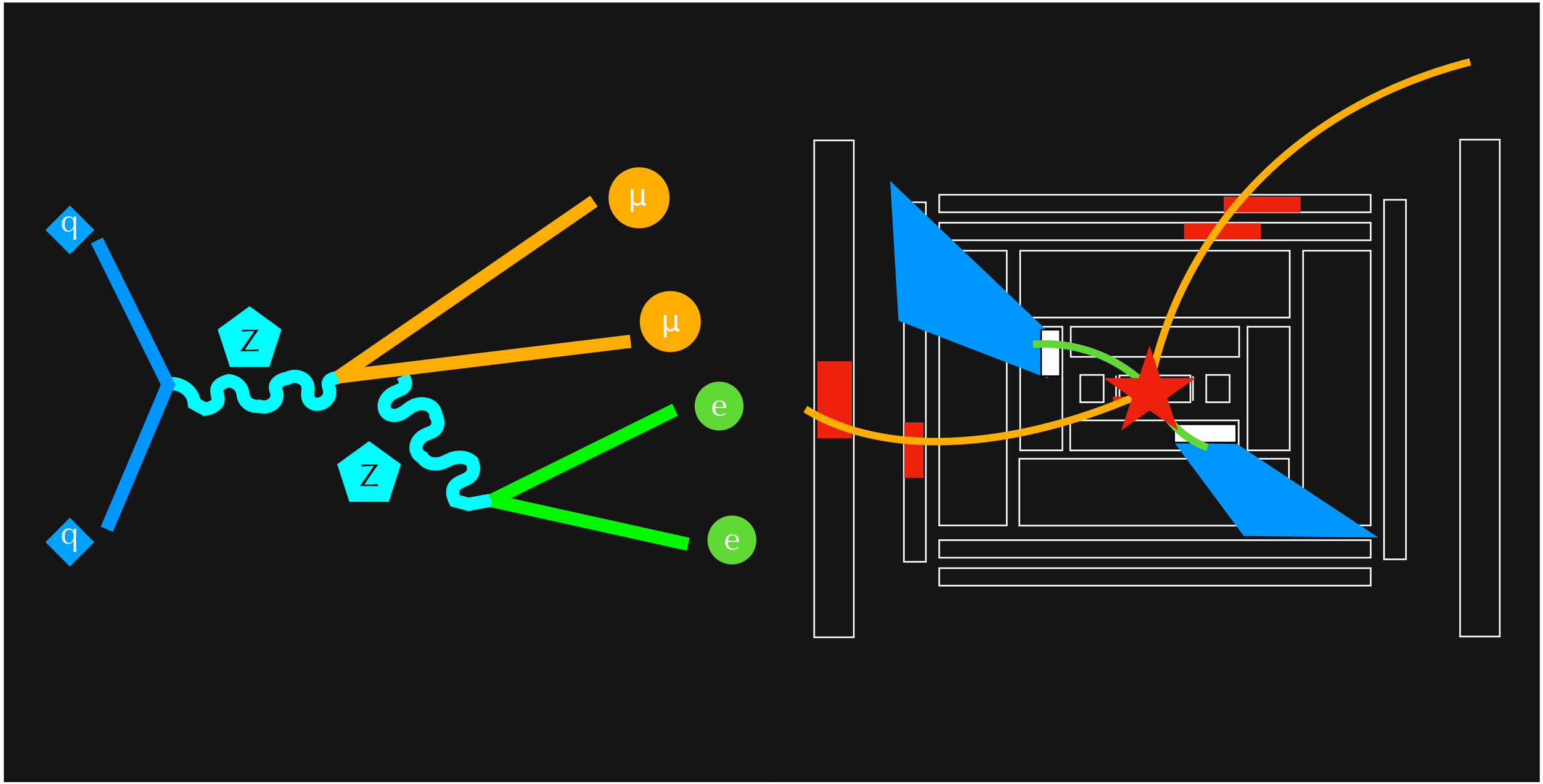
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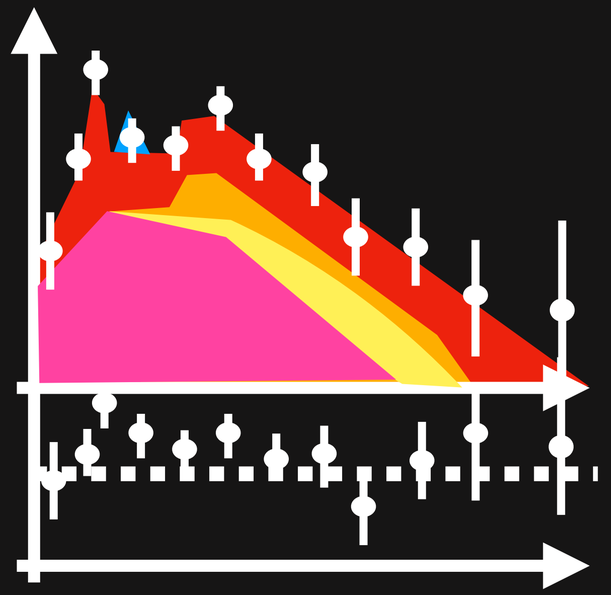
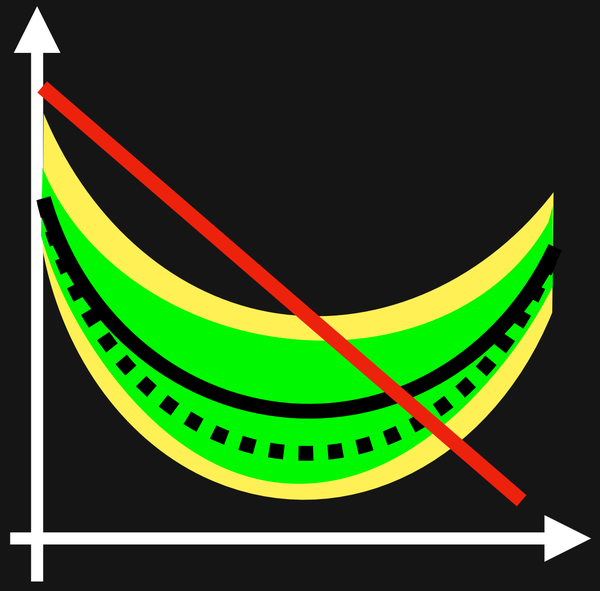
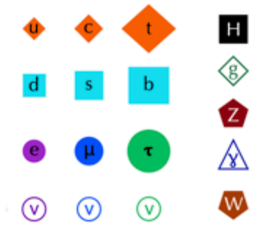




Your Collider ?

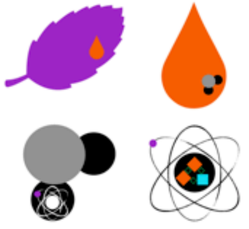
The Particle Physics Baby Book - *Explained !*

Page 1



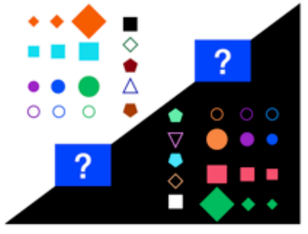
The **Standard Model** is the best guess we have so far of what the building blocks of the Universe are. It contains the **quarks**, the **charged leptons** and their **neutrinos.** The forces which connect these particles are carried by **bosons**, shown in the right-hand column.

Page 2



Let's journey into the world of particle physics: from a **leaf**, to a drop of **water**, to a **molecule of H_2O**, and to a **Hydrogen atom**, composed of **quarks** and **gluons** in the nucleus, orbited by an **electron**.

Page 3

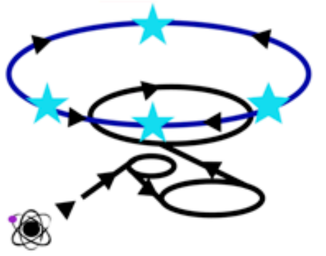


Could there be ***more*** particles than the ones we know about? **We suspect there are!** We are trying to find them. For example, in a theory called **Supersymmetry**, each Standard Model particle would have a heavier mirror twin.

Page 4

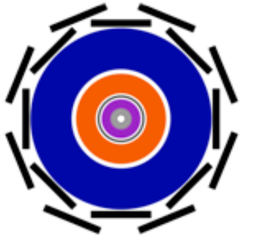
CERN is one of the places where we look for **new particles.** It's on the border between France and Switzerland. It is one of the biggest laboratories in the world!

Page 5



Welcome to the CERN accelerator complex! **Protons** (Hydrogen nuclei) are accelerated through a series of rings until they reach the **Large Hadron Collider,** moving at nearly at the speed of light. The protons are then **smashed together** so we can study the particles which are produced.

Page 6



At the collision points, we look for particles with huge detectors, which are like enormous 3D cameras. These pages show cross-sections of the **ATLAS detector**, across (page 6) and along (page 7). From the centre, the **tracking detectors** record trajectories of charged particles like electrons and muuons; the **solenoid magnet** bends the trajectories of particles so we can can estimate their momentum; the **electromagnetic calorimeter** picks up electrons and photons; the **hadronic calorimeter** measures activity from particles made of quarks and gluons; and the **muon spectrometer** tells us where muons passed.

Page 7

This is a Feynman diagram, which shows how an interaction takes place in a