

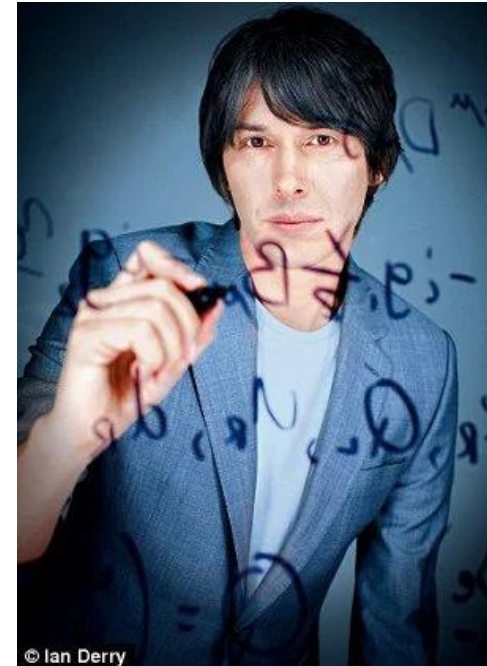


Is the CERN Fellowship the rockstar of postdocs?

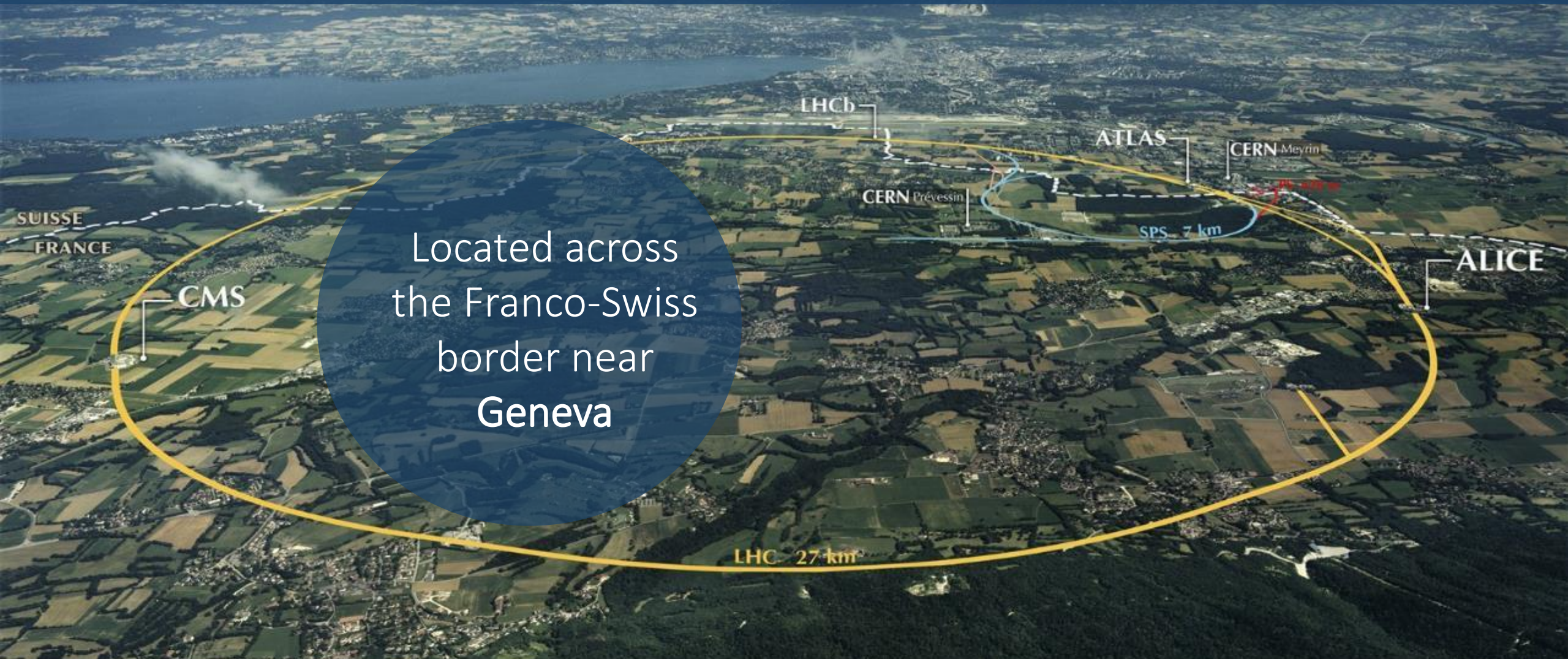
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CHIPP 2024 Annual Meeting, 20th June

I didn't choose the title...



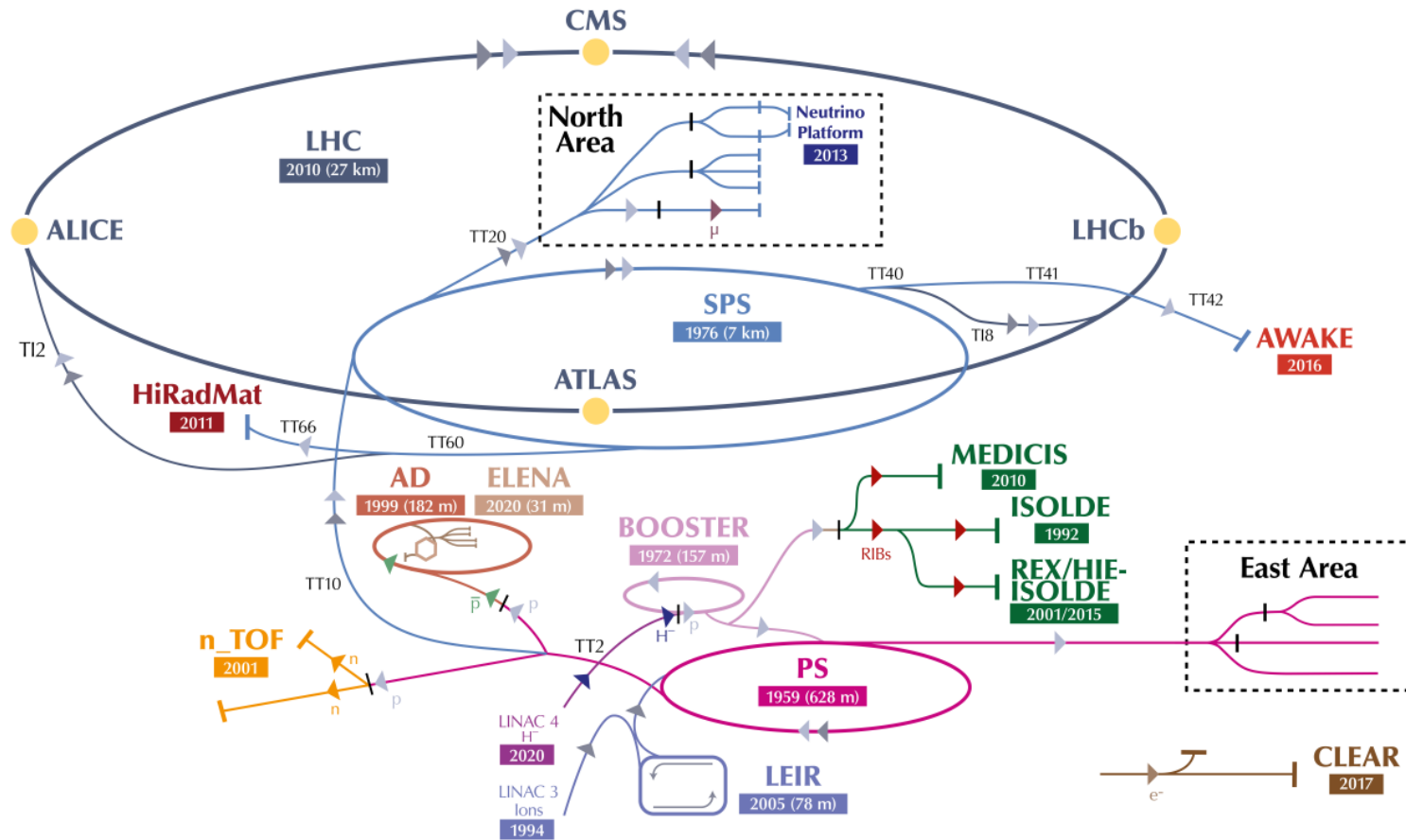
CERN is the world's biggest particle physics lab



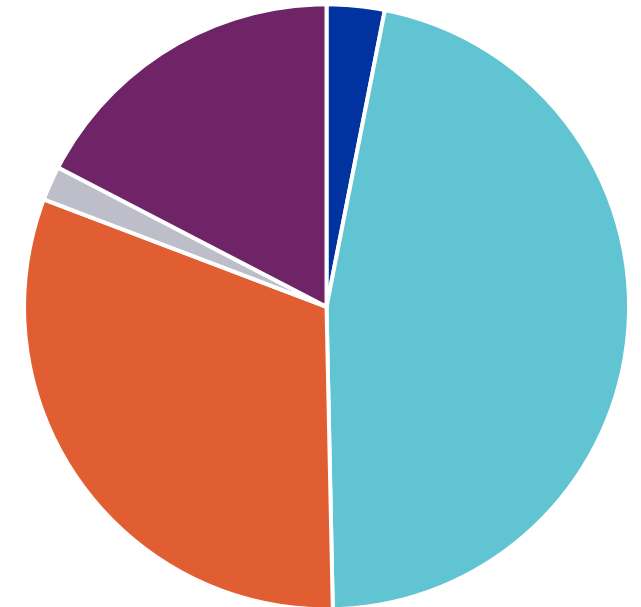
Located across
the Franco-Swiss
border near
Geneva

The heart of CERN is the experiments

The LHC is the largest and most powerful particle accelerator ever built



CERN permanent staff (2022 report)



- Research Physicists
- Technical work
- Administrative
- Scientific & Engineering work
- Manual work

... but there are also a few theorists

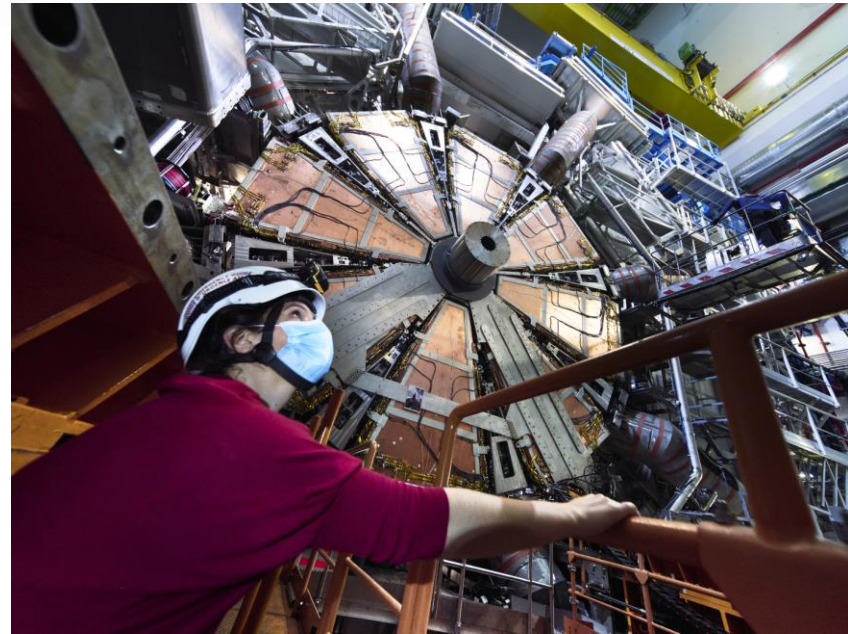


Most of whom are “Research Fellows”
= 3-year positions ~ postdocs

+ a handful of permanent staff, long-term
visitors, and visiting PhD students

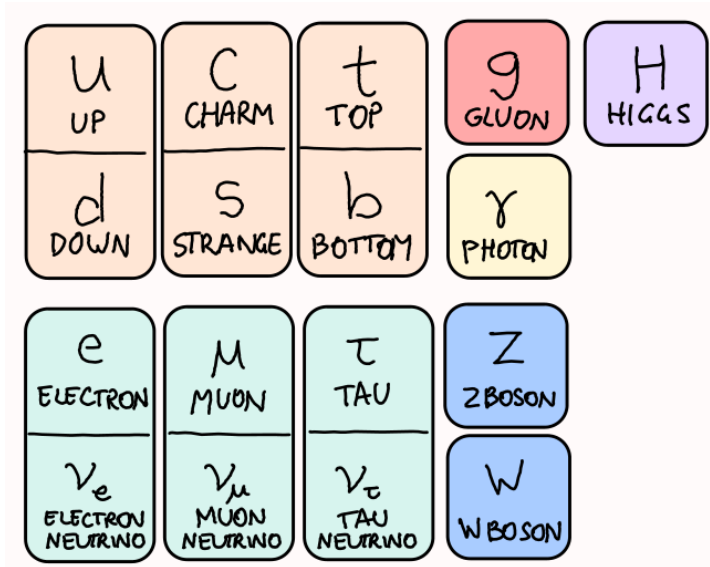
TH + EXP is how we push back the frontier

$$\begin{aligned}\mathcal{L} = & -\frac{1}{4} F_{\mu\nu} F^{\mu\nu} \\ & + i\bar{\psi}\not{D}\psi + \text{h.c.} \\ & + \chi_i y_{ij} \chi_j \phi + \text{h.c.} \\ & + |D_\mu \phi|^2 - V(\phi) \\ & + \text{new ideas}\end{aligned}$$



I work on theories Beyond the Standard Model

I am motivated by big mysteries unexplained by the Standard Model:



I work on theories Beyond the Standard Model

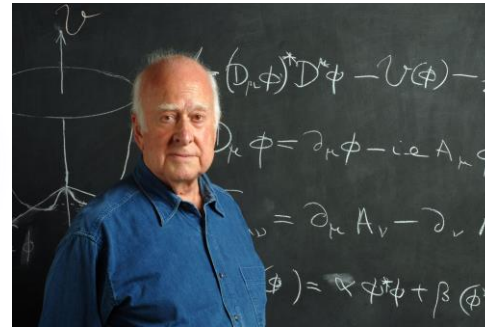
I am motivated by big mysteries unexplained by the Standard Model:

FLAVOUR! Why 3 copies?

And why are the heavy copies so heavy?  Check out my [podcast](#) about this!

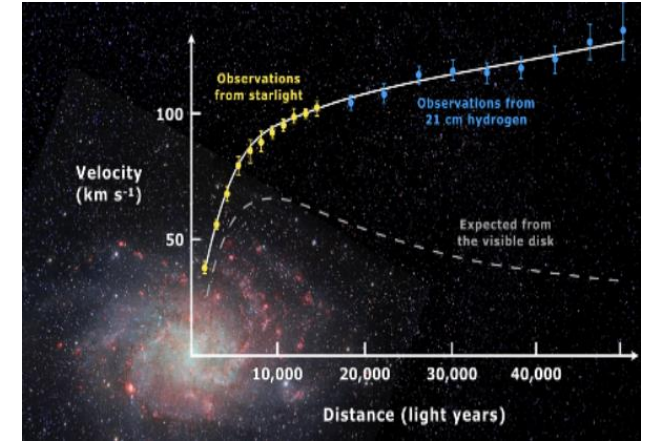
u UP	c CHARM	t TOP	g GLUON	H HIGGS
d DOWN	s STRANGE	b BOTTOM	γ PHOTON	
e ELECTRON	μ MUON	τ TAU	Z Z BOSON	
ν_e ELECTRON NEUTRINO	ν_μ MUON NEUTRINO	ν_τ TAU NEUTRINO	W W BOSON	

The Higgs remains largely mysterious. Is it natural?



What explains tiny neutrino masses?

How to test these BSM theories in the LHC & future colliders?



My Road to CERN



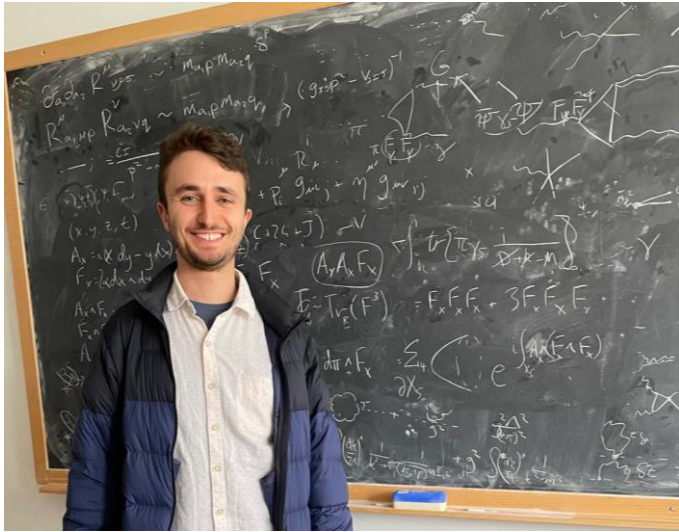
University of Zurich

- Postdoctoral researcher (2 yr)



Cambridge University

- PhD in Theoretical Physics
- Postdoctoral researcher (2 yr)



2023-present: Fellow
in CERN Theory

What is special about a CERN Fellowship?

3-year contract

You will be hired by a group (e.g. $BSM \subset TH$) but are essentially **free to pursue any research** you wish!



You won't have a "boss" as you might in a regular postdoc; you probably won't be suggested projects, so **should be self-sufficient** from the beginning

Therefore, it's not typical to take a CERN Fellowship as your first postdoc

(at least not in phenomenology – perhaps more common in formal theory)

What is special about a CERN Fellowship?

Opportunities and expectations as a CERN theorist:

- Lead new research directions in the field
- Propose / host workshops attended by the broader community
- Talk with, guide, and work with experimentalists especially in LHC collaborations
 - E.g. “collider cross talk” seminars; engagement in working groups (TH + EXP) e.g. Higgs WG, or large projects e.g. Next Gen Triggers; involvement with future projects like FCC
- Drink coffee in R1 with people

Applying to CERN

Application procedure is not too heavy – typically a short research statement, CV, references (important!), and NO interview

- Worth applying “out of season” after you’ve done your first postdoc (many young postdocs apply every year)

The **deadline is early** (earlier than most other postdoc deadlines), so don’t miss it!

Marie-Curie postdoc fellowships offer “another way in”, but here the application *is* heavy (the bonus is that winning a MC is proof of grant winning...)

Applying to CERN

In TH (certainly BSM), CERN values certain qualities in applicants beyond a “typical” postdoc, appropriate to the unique expectations, such as:

- Already established some research independence (evidence might be good papers without senior co-authors, or a strong reference letter outside your institution)
- Broad research interests, maybe connecting different topics
- Some originality
- Substantial (or rare) technical skill (arguably true for any postdoc...)

Important: you could demonstrate all these things with only a small number of papers and/or small number of citations! CERN staff will actually *read* your papers when selecting Fellows, and certainly do not just go off the ‘standard metrics’ for impact

Life after CERN?

After a successful CERN Fellowship, you will have probably

- Demonstrated more-or-less-complete independence as a researcher
- Established a large network of friends in the field, collaborators, ...
- Had meaningful dialogue with experimentalists, and maybe engaged in working groups etc
- Co-hosted workshops, TH institutes, etc
- Soaked up a huge amount of particle physics
- Enjoyed it!

All these things boost chances of a successful long-term career in HEP

The future is for you!

A Future Circular Collider at CERN will allow us to zoom in by x10, and **probe physics on completely unexplored scales** – putting the Higgs and the SM under the microscope. No one knows what we might find!

