Beamline for Schools

A physics competition for high-school students

Powered by CERN and DESY!

BTTB13
Valencia, España
May 21st 2025

beamline
for schools

cern.ch/bl4s

powered by CERN & DESY

What is BL4S?

Perform your own experiment at a real particle accelerator!
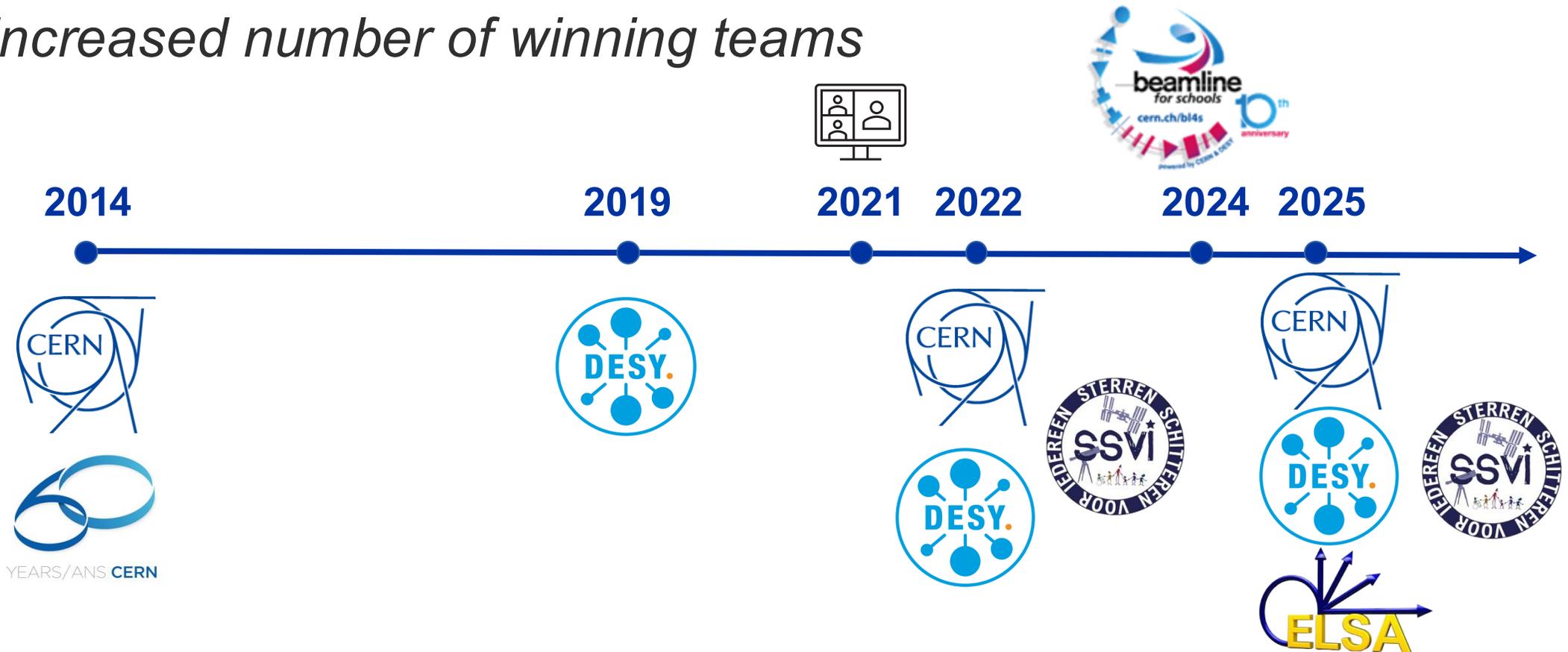
You can be a scientist

Teams of high school students from all around the world can propose an experiment that they want to perform at a particle accelerator.

Milestones

A new facility: Electron accelerator ELSA in Bonn, Germany

⇨ *increased number of winning teams*

Who can participate in BL4S?

❖ **Teams:** min. 5, max. 9 people, ≥ 16 years old (when submitting your proposal)

❖ Enrolled in **high-school** in the school year 2025/2026 or gap between school and university

❖ Each team has to be led by an adult "**team coach**" (max. 2 per team)

Experiment proposal

Written proposal (~1000 words)

❖ Motivation (~ 100 words)

❖ Proposed experiment (~800 words)

❖ What you hope to take away from this experience (~100 words)
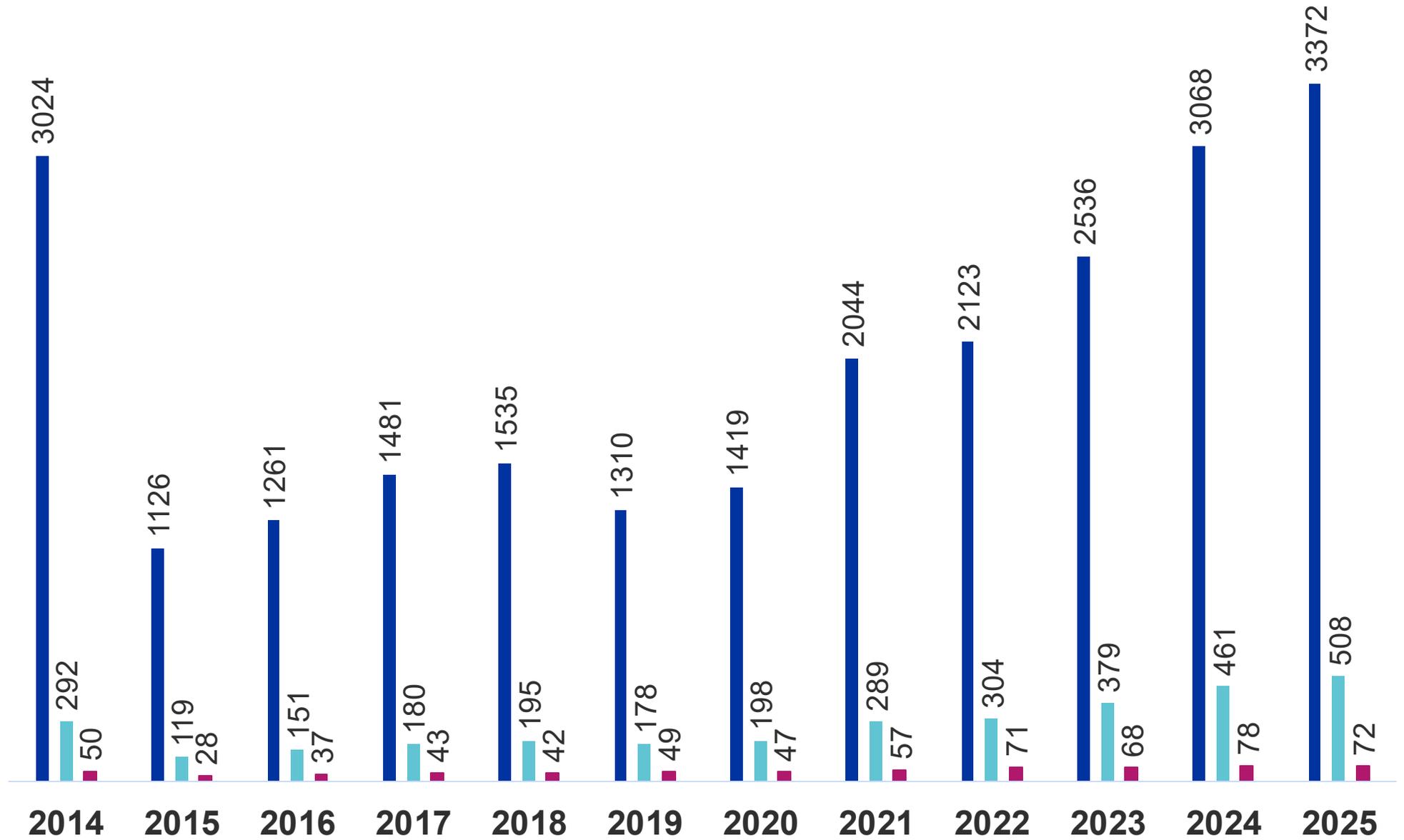

Video proposal
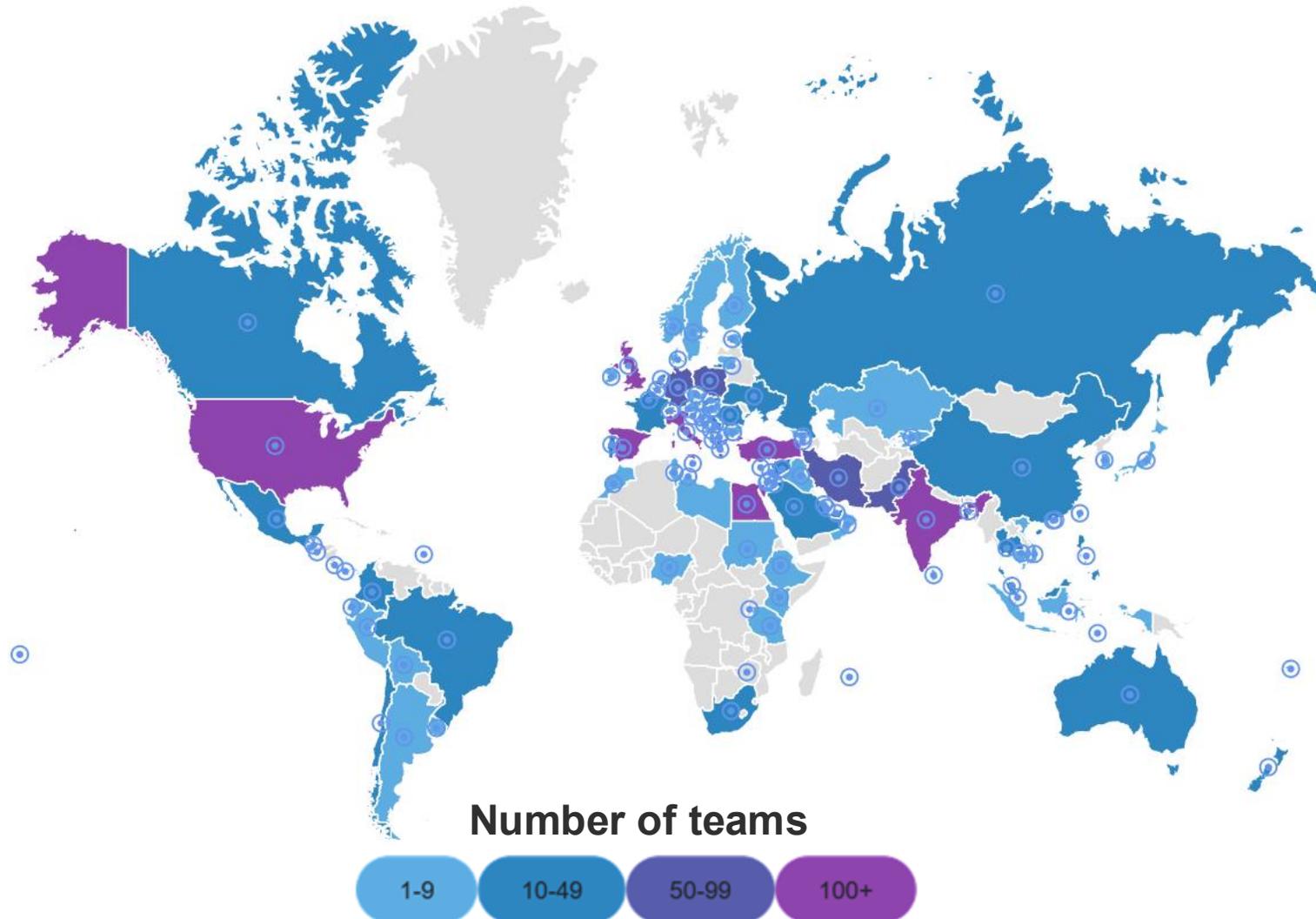(~1 min, optional)
Outreach proposal
(optional)

Impact

Legend: Students, Proposals, Countries

Year	Students	Proposals	Countries
2014	3024	292	50
2015	1126	119	28
2016	1261	151	37
2017	1481	180	43
2018	1535	195	42
2019	1310	178	49
2020	1419	198	47
2021	2044	289	57
2022	2123	304	71
2023	2536	379	68
2024	3068	461	78
2025	3372	508	72

Countries participating in BL4S since 2014

Winning teams

America:

Canada, Mexico, USA (x3)

Africa:

Egypt, South Africa

Asia:

India, Japan, Pakistan, Philippines

Europe:

Estonia, France, Germany, Great Brittain, Greece, Italy (x3), Netherlands (x3), Poland, Spain, Switzerland

Number of teams

1-9   10-49   50-99   100+

Special prizes 2025

Award for the best video proposal: BL4S t-shirts and DIY cloud chamber – **3 teams**

Award for the best outreach proposals: BL4S t-shirts and telescopes (sponsored by the Belgian project "Stars Shine For Everyone") – **15 teams**

Shortlisted teams: BL4S t-shirts and DIY cloud chamber and beta/gamma detector – **50 teams**

Special support 2025

A big thanks to Jean-Pierre Grootaerd

Special support 2025

10 yrs
Bridging science and society

CERN & Society Foundation

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Donate now and make the difference for the next generation of scientists

Winning teams 2024

- ❖ **"Mavericks" from Estonia (CERN)** calibrate their homemade muon detector for high-altitude ballooning applications

- ❖ **"Sakura Particles" from Japan (CERN)** optimise their homemade two-dimensional muon detector for muon tomography applications

- ❖ **"SPEEDers" from the USA (DESY)** research Smith Purcell radiation as a tool for beam diagnostics

Winners of the 2024 CERN Beamline for Schools competition: "**Sakura Particles**" from Japan (left), "**Mavericks**" from Estonia (top right) and "**SPEEDers**" from the USA (bottom right) (Images: Sakura Particles, Mavericks, SPEEDers)

Winning teams 2025

Two winning teams will be invited to **CERN** in Geneva, Switzerland, to conduct their proposed experiments (~2 weeks).

Two winning teams will be invited to **DESY** in Hamburg, Germany.

One winning team will be invited to **ELSA** in Bonn, Germany.

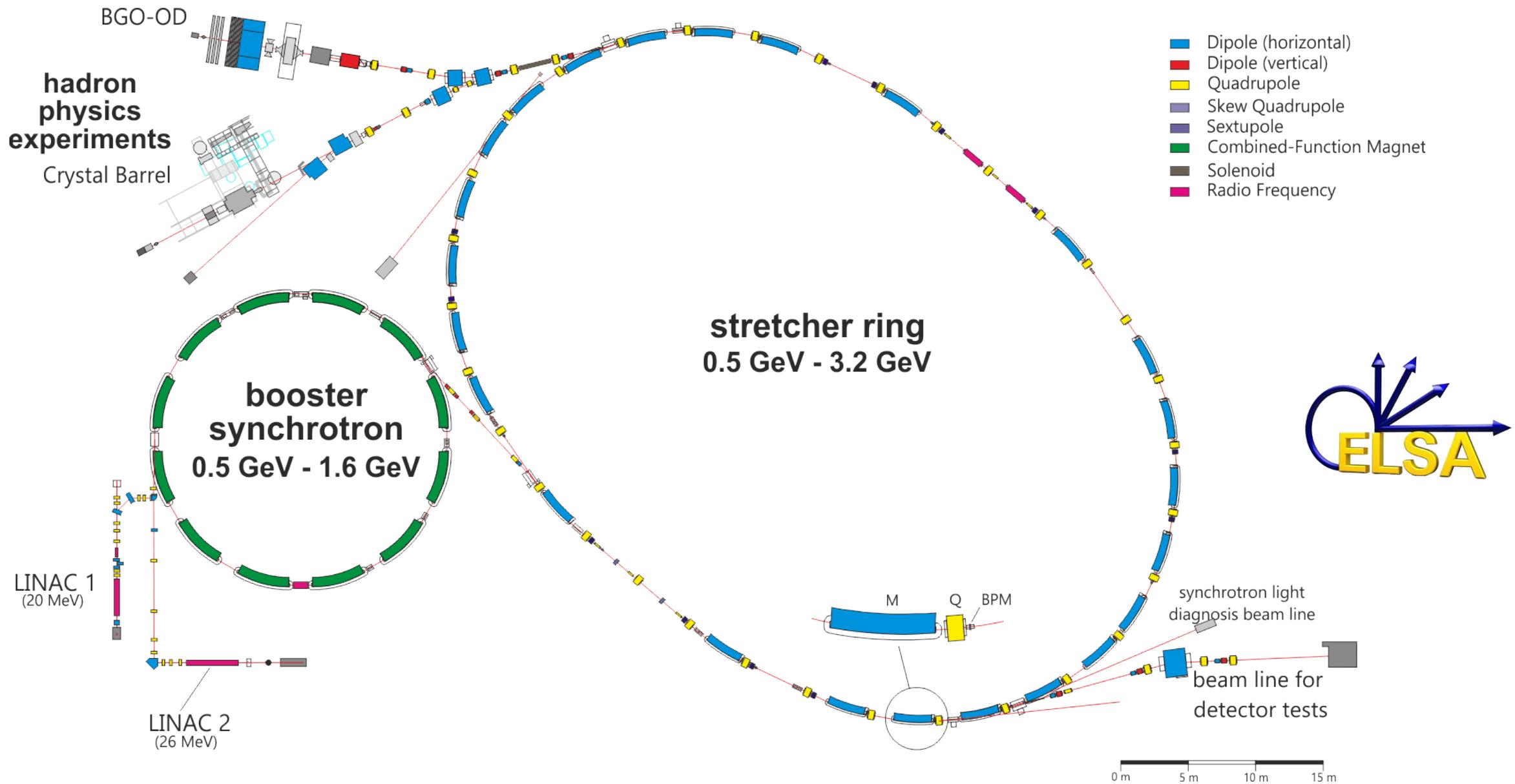The CERN accelerator complex
Complexe des accélérateurs du CERN

East area

- ❖ **Experimental areas 'T'**
- ❖ **Control rooms 'Hut'**

BGO-OD

hadron physics experiments

Crystal Barrel

Dipole (horizontal)
Dipole (vertical)
Quadrupole
Skew Quadrupole
Sextupole
Combined-Function Magnet
Solenoid
Radio Frequency

stretcher ring
0.5 GeV - 3.2 GeV

booster synchrotron
0.5 GeV - 1.6 GeV

LINAC 1
(20 MeV)

LINAC 2
(26 MeV)

M   Q   BPM

synchrotron light diagnosis beam line

beam line for detector tests

ELSA

0 m   5 m   10 m   15 m

EPS HEPP Outreach Prize

Markus Joos and Jorge Villa from CERN will receive the prize in the name of all the BL4S organisers since 2014

Thank you for your attention!
Questions?