Search for light dark particles at LHCb

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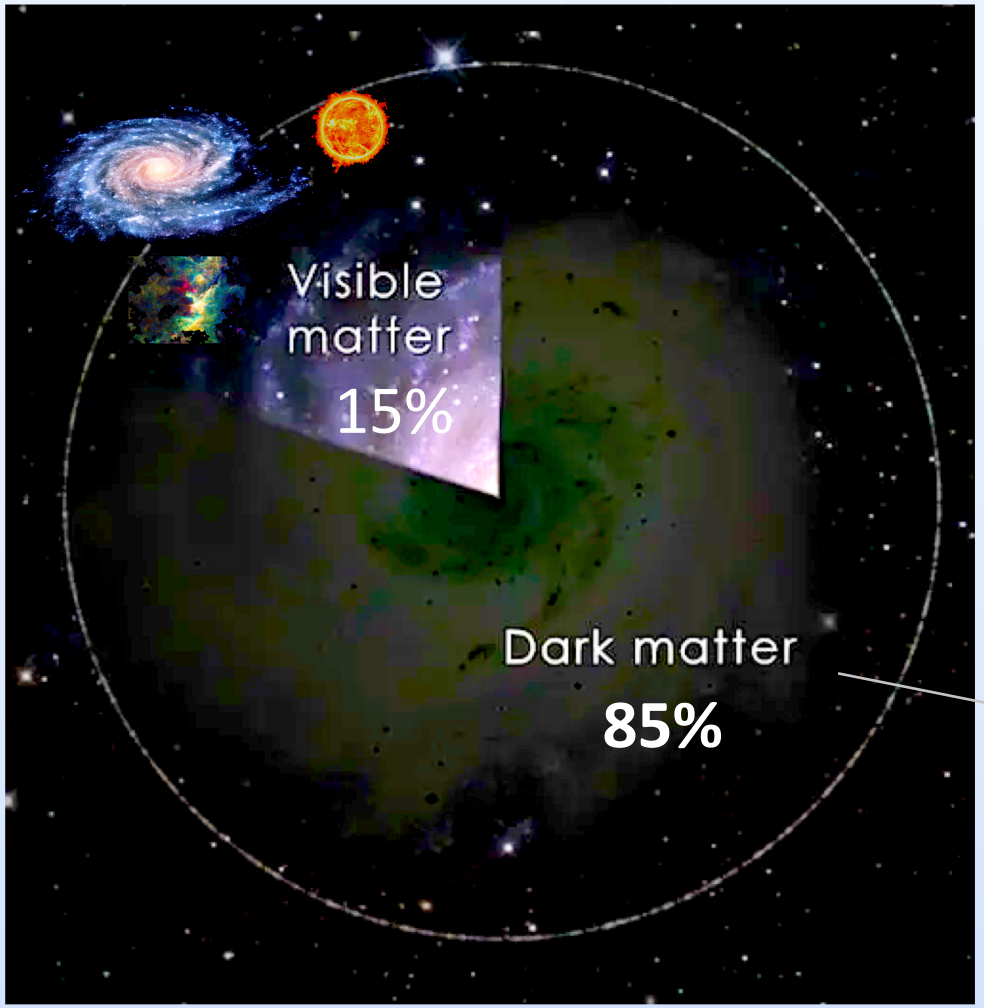
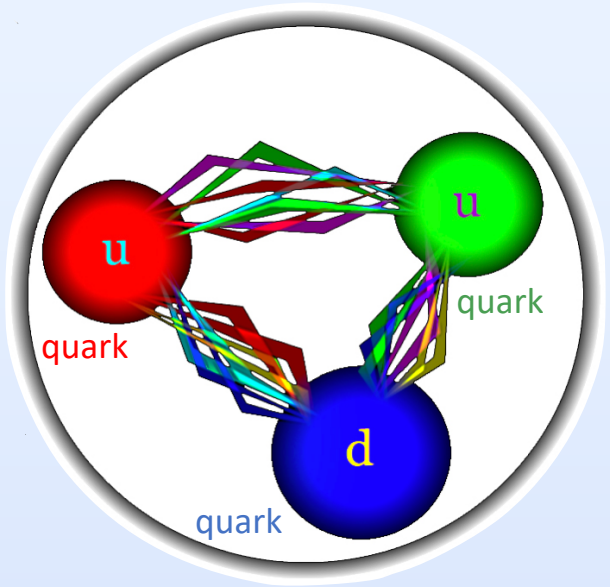
MATTER IN UNIVERSE



- abundant
- invisible
- most likely made of new type of subatomic particles

BUILDING BLOCKS OF MATTER

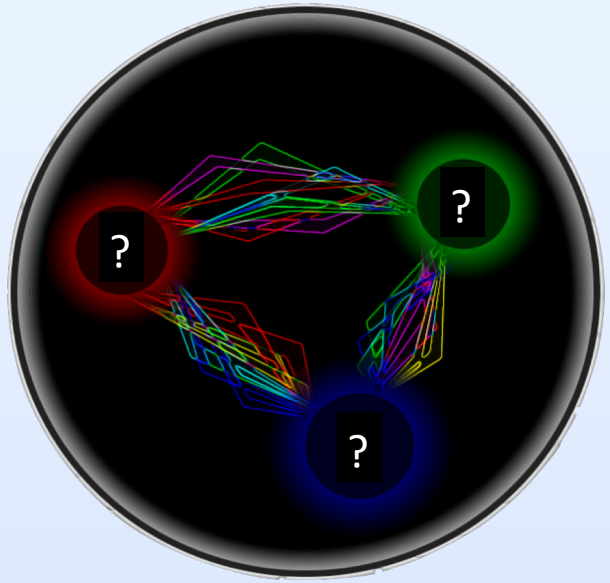
Ordinary matter



stable *hadron*: proton

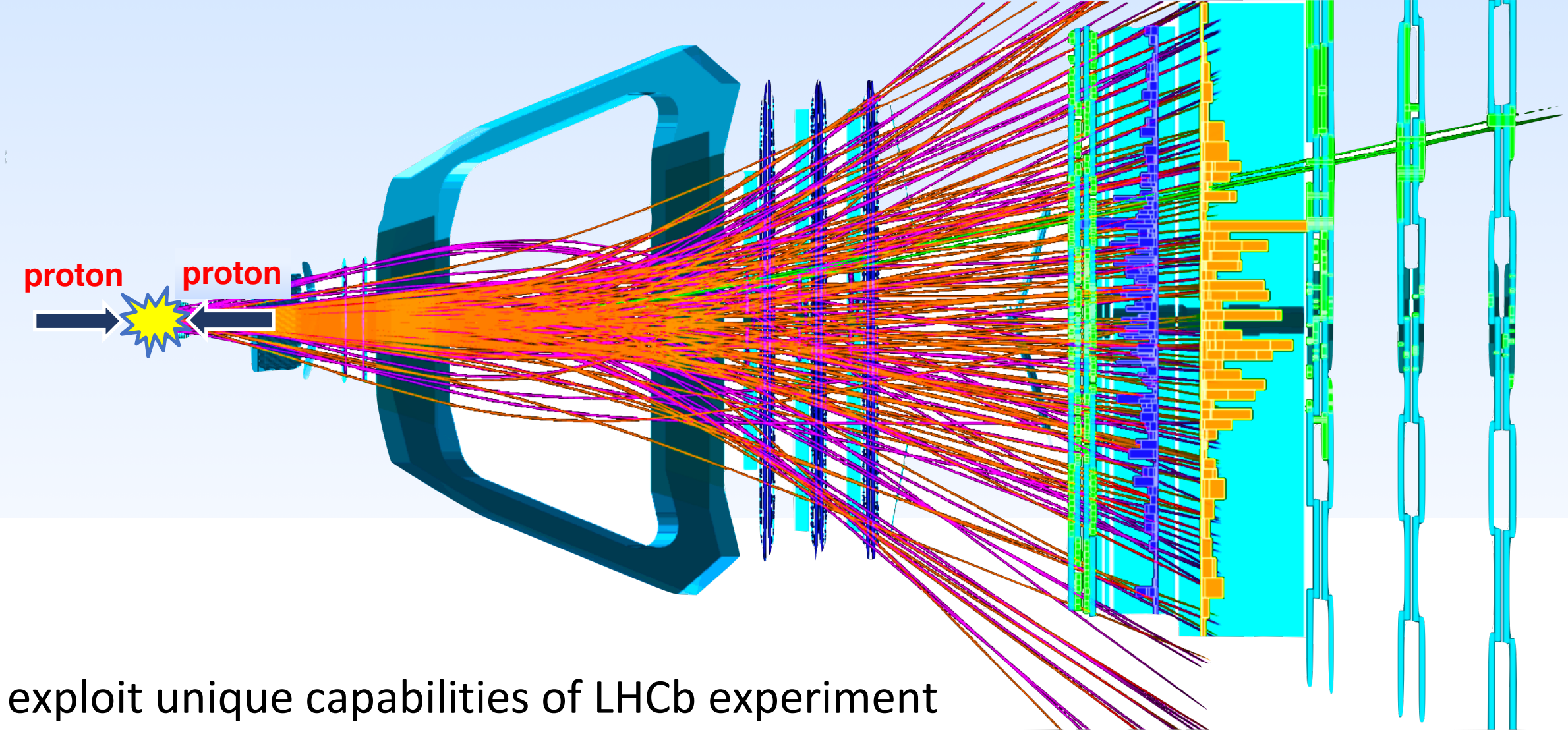
other *hadrons* decay

Dark matter



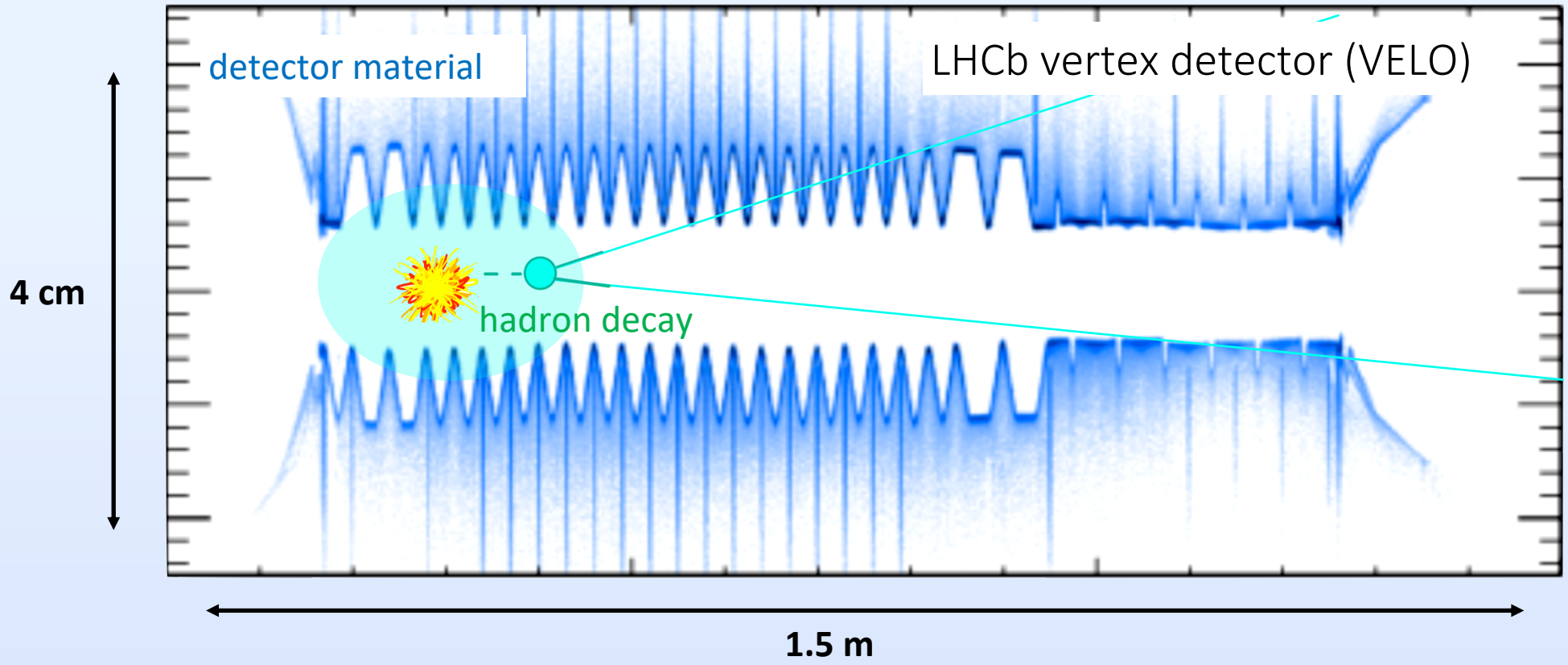
stable *dark hadron*

other *dark hadrons*
may decay to ordinary matter
→ detectable



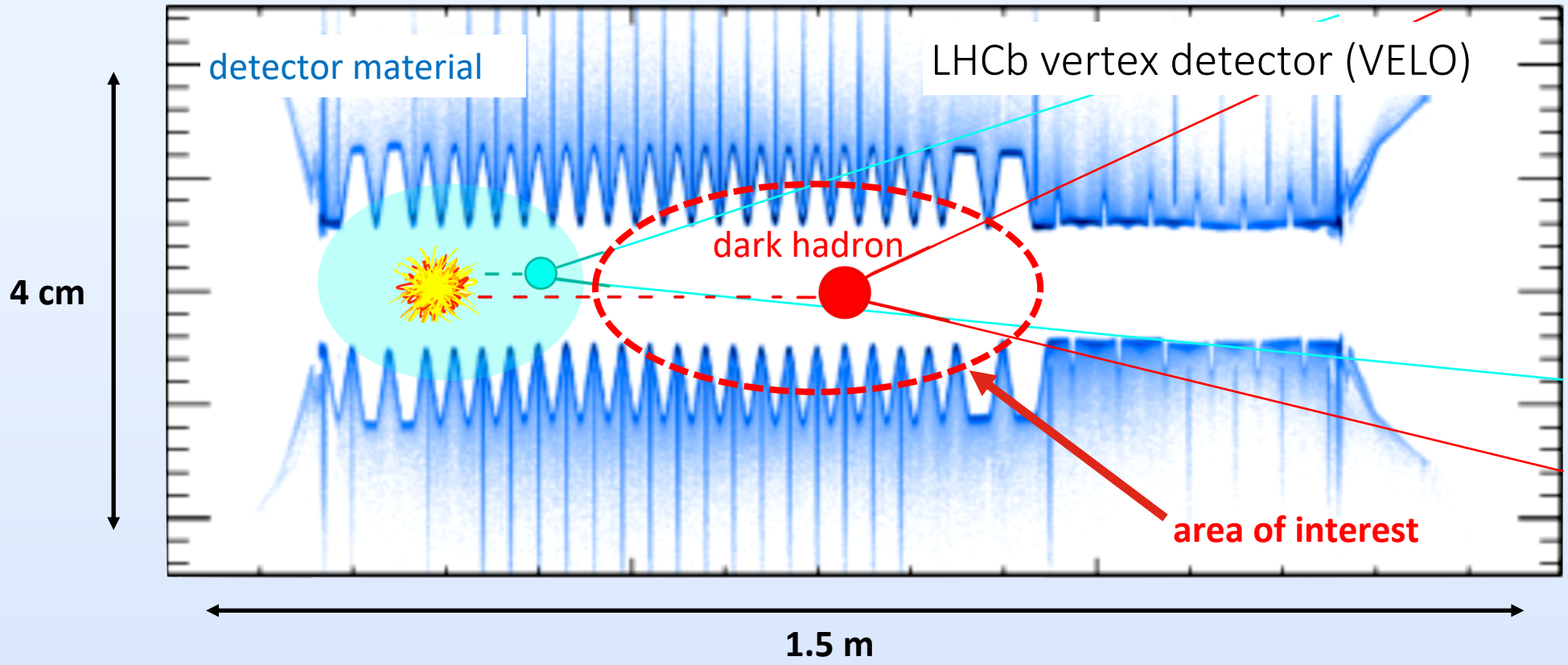
- exploit unique capabilities of LHCb experiment
- unique search for light dark particles

SEARCH FOR DARK HADRONS AT LHCB



- LHCb is the best in hadron studies: more than 50 discoveries

SEARCH FOR DARK HADRONS AT LHCB



- Dark hadrons: just like a search for *hadron that flies long distance*

challenge: suppress background from ordinary hadrons

→ room for novel machine learning techniques

→ theory and phenomenology: fast simulation tool

HOW WILL IT LOOK LIKE

- Very interesting physics case
- Collaboration with experimentalists from CERN, theorists from US
- Data analysis – python based
- Non trivial machine learning
- Phenomenology and fast simulations
- More hardcore C++ reconstruction algorithms development - also possible

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