

SUMMARY OF LAST QUARKNET WORKSHOP

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Last Agenda

<https://quarknet.i2u2.org/content/cms-data-workshop-university-florida-june-2017>

Thursday June 29

- 09:00 Coffee, **Registration**
- Introductions
 - Objectives
 - Housekeeping
 - Data Portfolio
- 09:30 8-fold way (Acosta)
- **Quark Model**
- 10:00 *Particle Physics, LHC, and CMS* (Acosta)
- Slides
- 11:00 Break
- 11:15 Level 1 Data Portfolio Activities
- **Quark Workbench**
 - **Rolling with Rutherford**
- 12:00 Lunch
- 13:00: Reflection and discussion
- 13:30 Level 2 Data Portfolio Activity:
- **CMS Data Express**
- 14:30 Break
- 14:45 Level 2 Data Portfolio Activity
- **Z Mass**
 - **Slides on particle mass**
- 15:45 Reflection and discussion
- 16:00 End of day

Friday June 30

- 09:00 Coffee/Recap of Yesterday/Plan for Today
- 09:30 CMS Virtual Visit
- 10:00 Level 2 Data Portfolio Activity:
- CMS Masterclass Measurement
 - **Objectives**
 - **Slides**
 - **iSpy-webgl**
 - **CIMA**
 - **Cheat sheet**
 - **CMS detector animation**
- 12:00 Lunch
- 13:00 Wrap-up CMS Masterclass
- Discuss results
 - Discuss **International Masterclasses**
 - Tour **Masterclass Library**
- 13:45 Level 3 Data Portfolio Activity: **CMS e-Lab**
- Introduction
 - Exploration of Project Map
- 14:30 Break
- 14:45 Implementation Plans/How to Use
- Reflect
 - Write in UF group site
 - Present
- 15:30 **Implementation, Satisfaction** surveys
- 16:00 End of Workshop



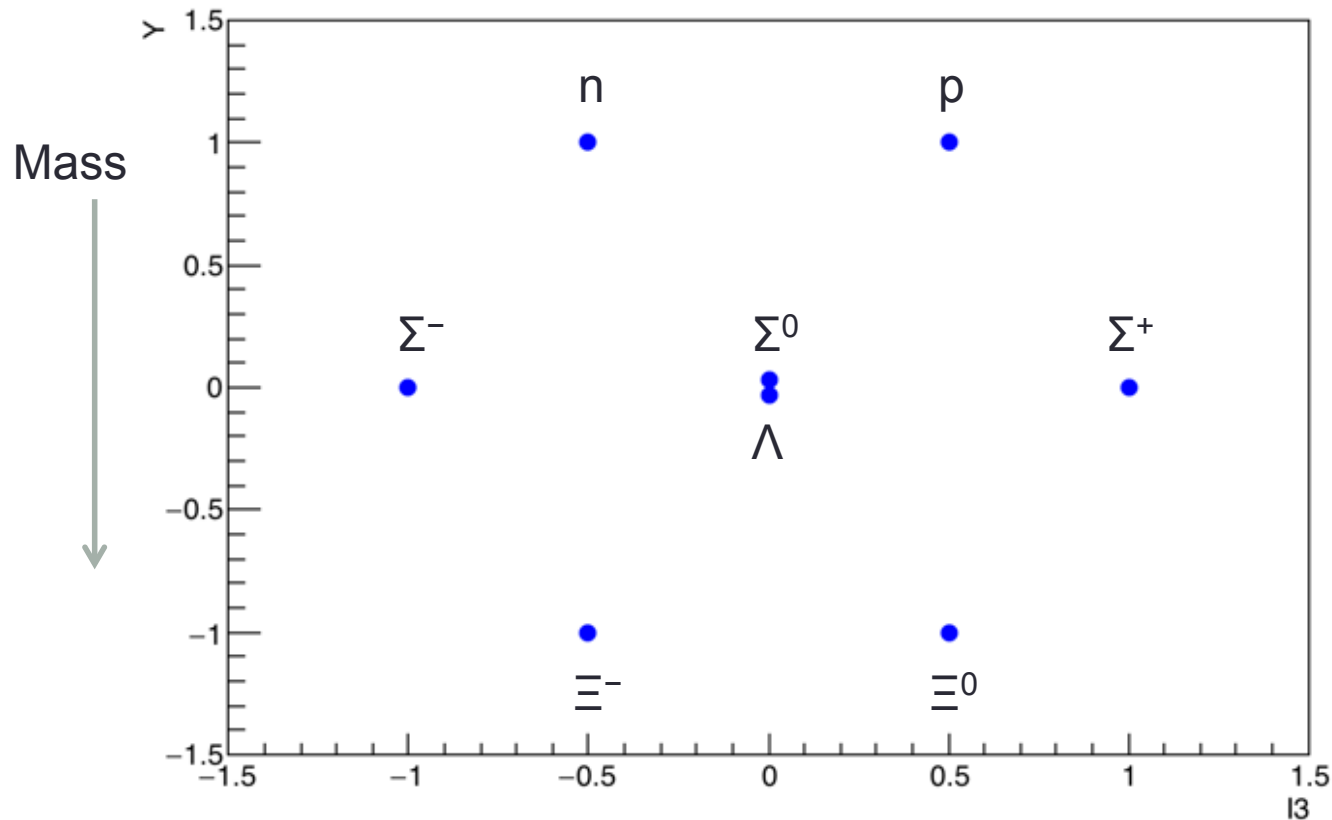
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Spin 1/2 Baryons



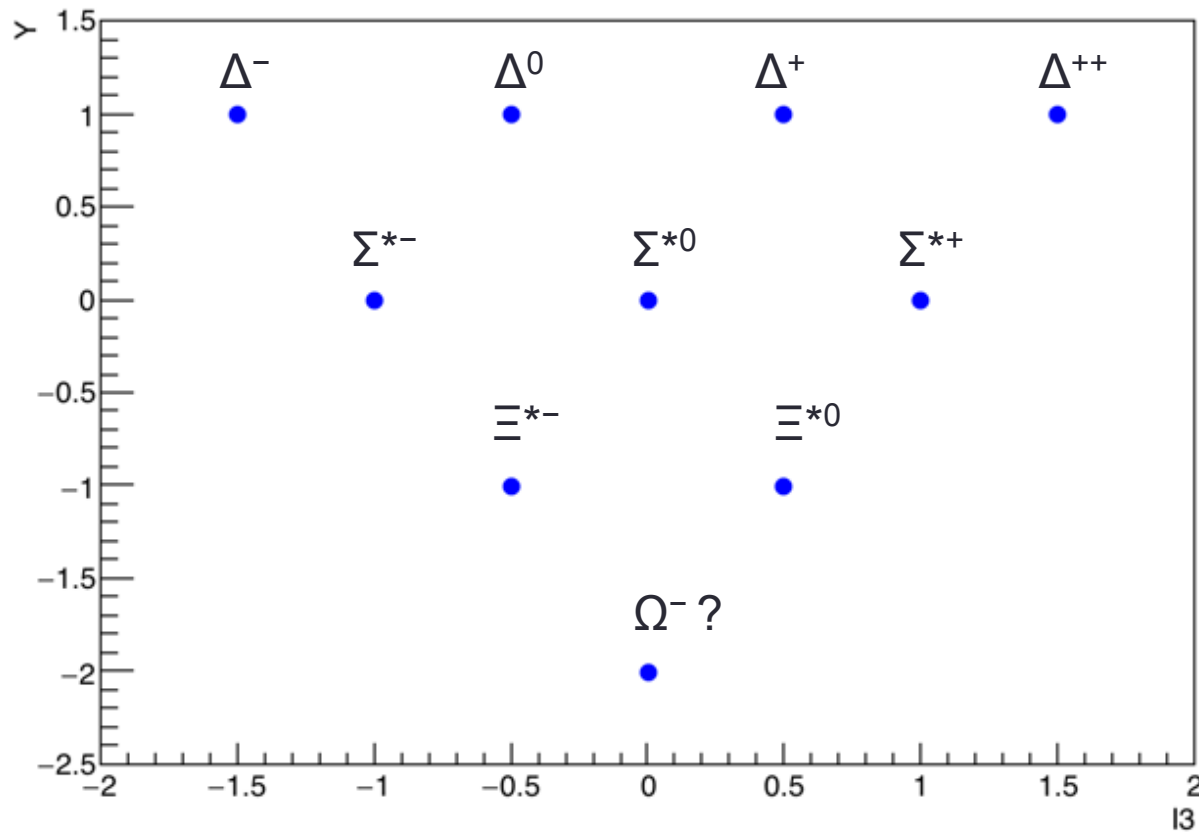
Eightfold way activity:
patterns in particle
masses (families) and
electric charge

→ Quark Model:

- Up
- Down
- Strange
- Charm
- Bottom
- Top

Particle equivalent of the periodic table of elements

Spin 3/2 Baryons



Eightfold way activity:
patterns in particle
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→ Quark Model:

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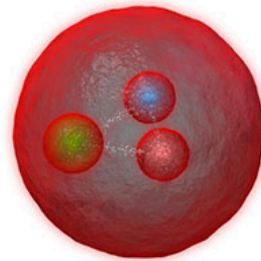
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- ▶ 2017
 - ▶ July 2017
 - ▶ June 2017
 - ▶ May 2017
 - ▶ April 2017
 - ▶ March 2017
 - ▶ February 2017
 - ▶ January 2017
- ▶ 2016
- ▶ 2015
- ▶ 2014
- ▶ 2013
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- ▶ 1997

First doubly charmed baryon spotted by LHCb

Jul 6, 2017 [6 comments](#)



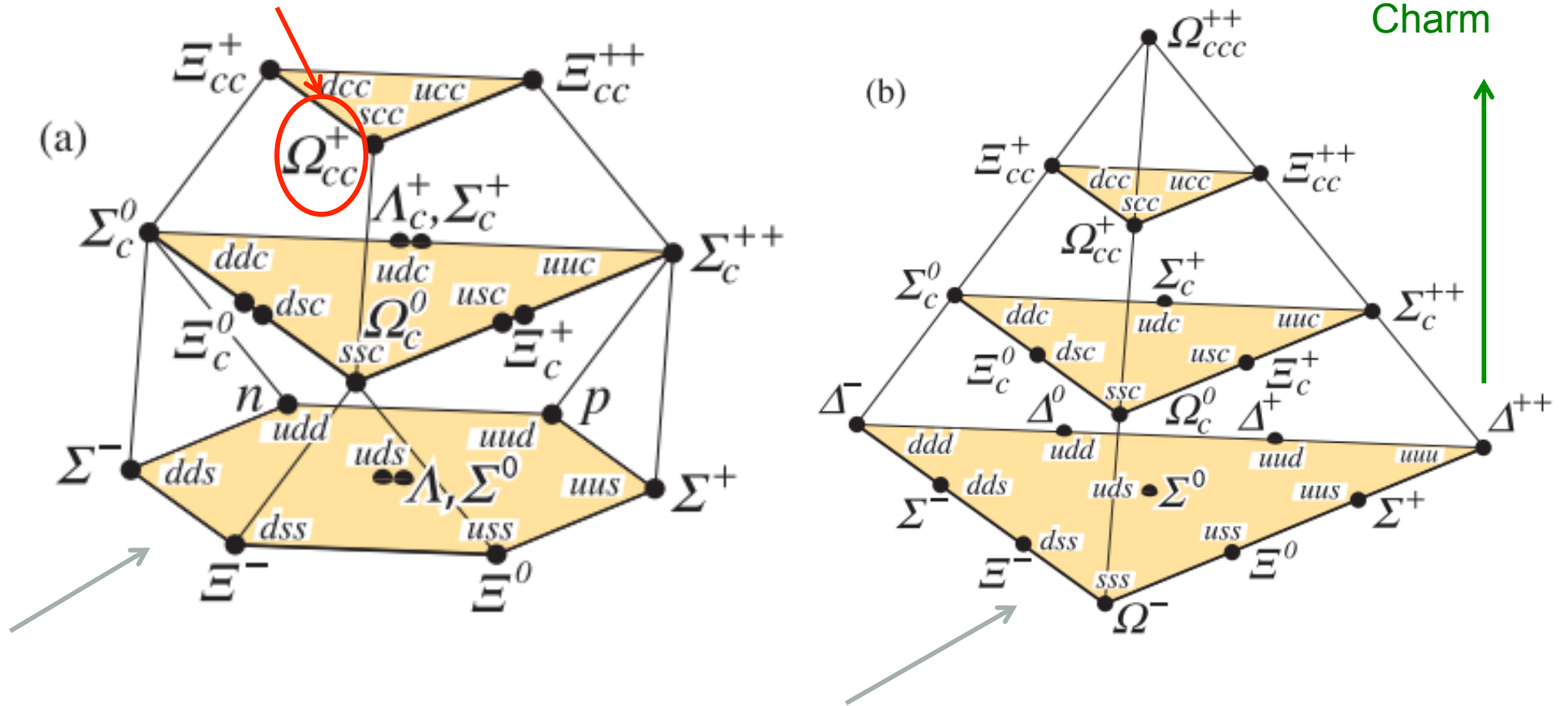
Doubly charmed: illustration of Ξ_{cc}^{++}

The first detection of a baryon containing two charm quarks has been made by physicists working on the LHCb experiment at the Large Hadron Collider (LHC) at CERN. Weighing in at 3621 MeV, the Ξ_{cc}^{++} particle has about the same mass as a helium-3 nucleus. Although the particle – which also contains an up quark – is predicted by the Standard Model of particle physics, its discovery and subsequent study should give important information about how to calculate the properties of particles made up of quarks.

Baryons are particles with three quarks and include the familiar proton and neutron (comprising up and down quarks) as well as more exotic particles that can contain charm, strange and bottom quarks. Quarks interact via the strong force and this is described by the theory of quantum chromodynamics (QCD). However, the nature of the strong force makes it extremely difficult to calculate the properties of baryons using QCD.

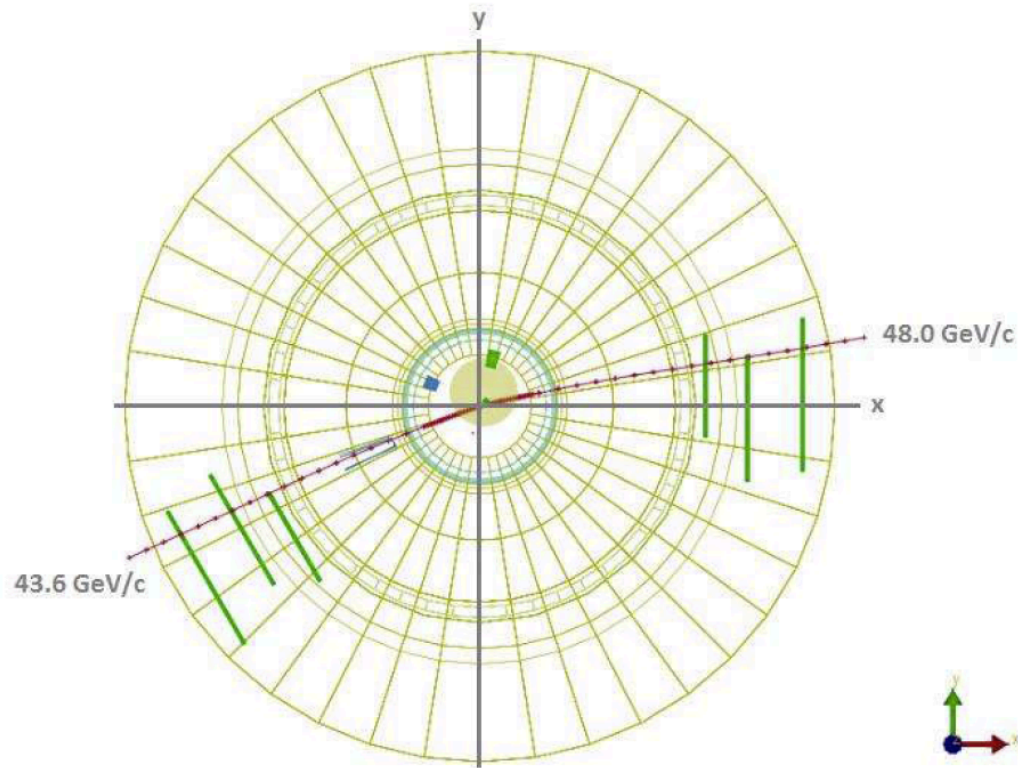


A doubly-charmed baryon, recently discovered in July by the LHCb experiment



Calculated some masses and categorized events (Z and W boson decays to muons)

Run 148029 Event 399491540



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