First observation of DCS decay of a charmed Brayon:

$$\Lambda_c^+ \to pK^+\pi^-$$

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Outline

- Today let's talk more about physics rather technique details.
- **Outline**
  - Experimental status of charmed hadrons
  - weak decays of Lambda_c
  - some highlights of this paper

experimental status of charmed hadrons: meson V.s. baryon

- For charmed mesons, many doubly Cabibbo-suppressed(DCS) decay channels have been discovered.
- But for charmed baryons, before this paper, no direct experimental observation due to smaller production cross sections.

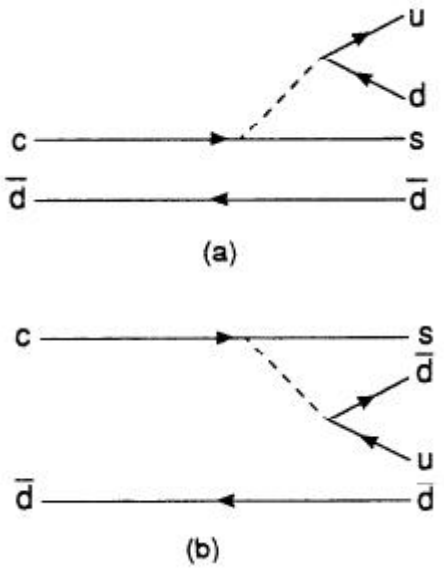
Weak Decays of Lambda_c (1)

- Higher excited charmed hadrons mainly decay through strong or electromagnetic interactions.

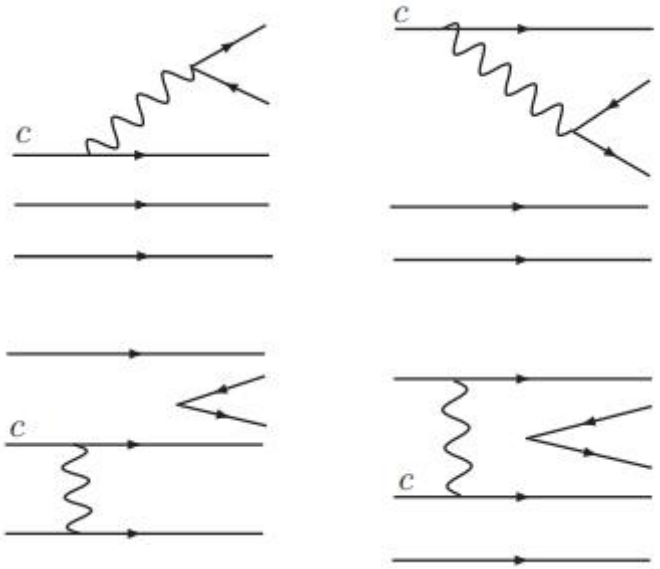
- Study of weak decays of charmed hadron focuses on the ground states, such as D^0 and Lambda_c

Weak Decays of Lambda_c(2)

- Unlike charmed meson decays, internal W emission and W exchange processes are not suppressed for charmed baryons.



external and internal W emission in D+ decay



Lambda_c hadronic weak decays

Weak Decays of Lambda_c(3)

- **The weak decays of charmed hadron is not well yet.**
- **Some reasons:**
  - experimentally small data sample
  - baryons are made of three quarks
  - Some theoritical technique does not work well, example, some approximation for two body system, 'soft-meson outgoing' technique....
  - W-change plays more important and complicated role in baryon decays
- Unclear yet, difficult to calculate,more complicated in physics picture, that's why Lambda_c decays are interesting.

We high energy physicists never satisfied with only doing easy things!

Highlights of this paper (1)

- This work is done by Belle, using ~900fb data to select the ee \to qqbar continium process of Lambada_c production. The Lambada_c candidates from B mesons are rejected.
- The first doubly cabbibo suppressed process of a charmed baryon to be observed;
- Lambada_c decay study reaches the doubly cabbibo suppressed level by Belle

Highlights of this paper(2)

- Unlike BESIII near threshold pair production, Belle could directly measure the absolute branching fractions.
- But could be measured with the help of the branching ratio with the golden channel.
- Also, this ratio(2.35 ± 0.27 ± 0.21) × 10−3) corresponding (0.82 ± 0.12)tan^4 θc,
- Indicate that the internal W-change does not make a large contribution to Lambada_c decay.

Thanks