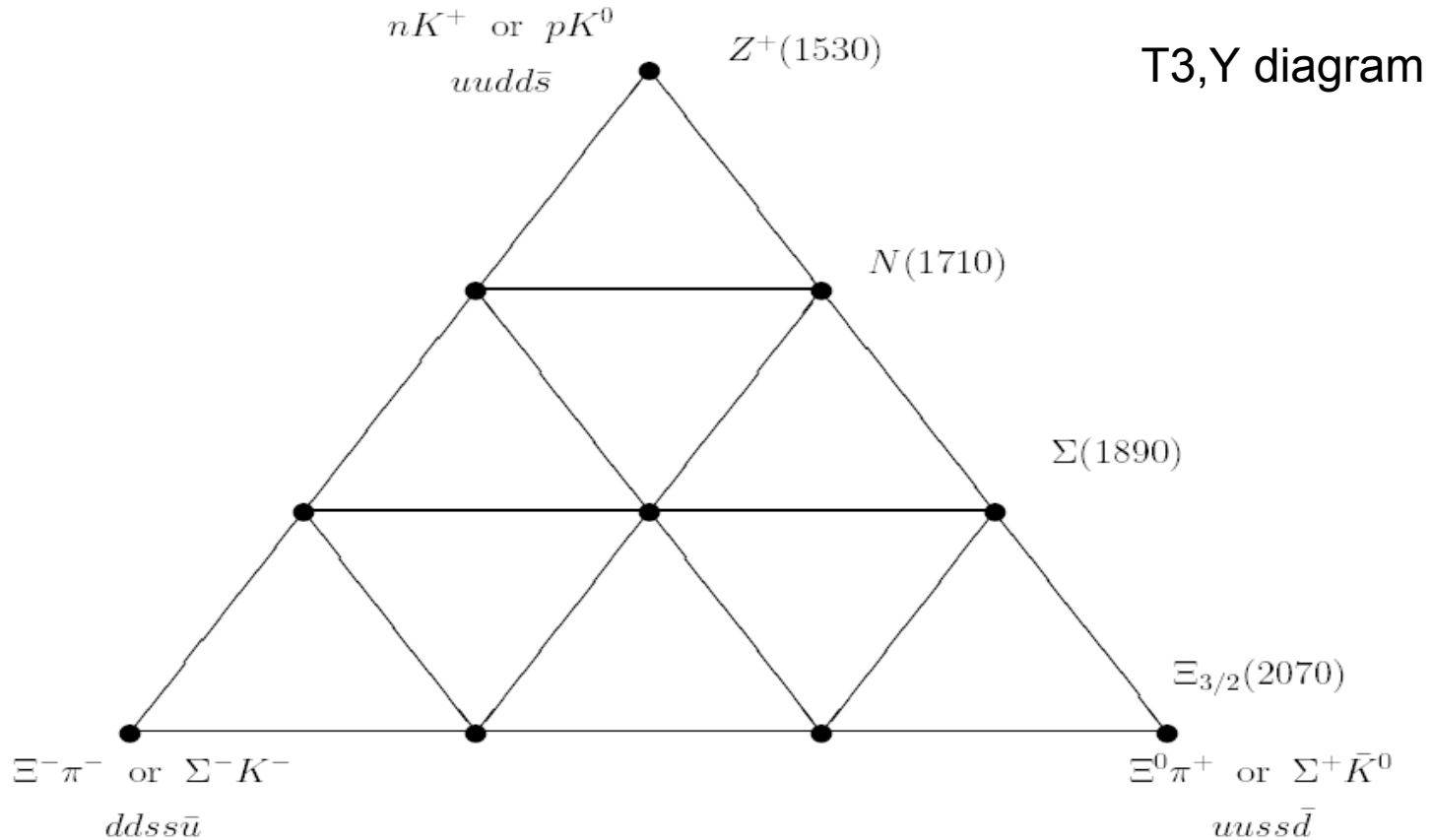


The Search of the Pentaquark



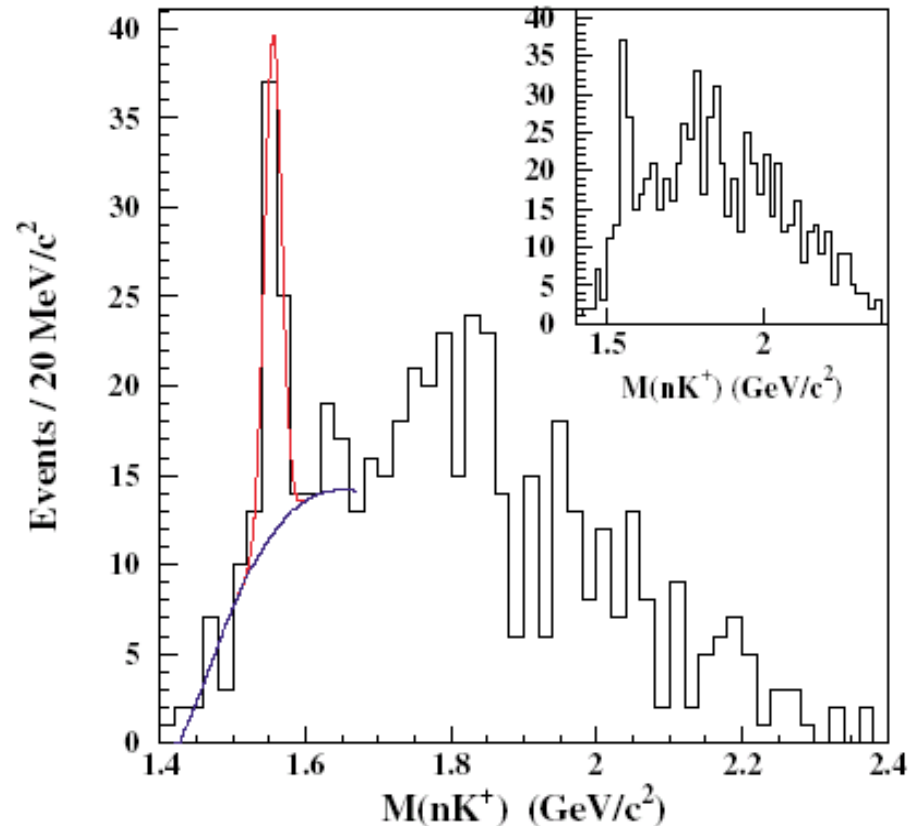
Predictions by Dianakov using the soliton model in QCD (1997) Nordita 97-19N
 Masses agree with the quark composition theory.

First candidate: $uudd\bar{s} = \Theta^+$

- LEPS - SPring-8 $\Theta^+(1540)$.
 $\gamma n \rightarrow K^-\Theta^+ \rightarrow K^-K^+(n)$ 4.6 s.d.
- DIANA - ITEP $\Theta^+(1539)$.
 $K^+n \rightarrow \Theta^+ \rightarrow K^0p$ 4.4 s.d.
- CLAS
 $\gamma d \rightarrow K^-p\Theta^+ \rightarrow K^+K^-p(n)$
 $\gamma p \rightarrow K^{*0}\Theta^+ \rightarrow \pi^+K^-K^+(n)$

arXiv:hep-ph/0408001v2 (2004)

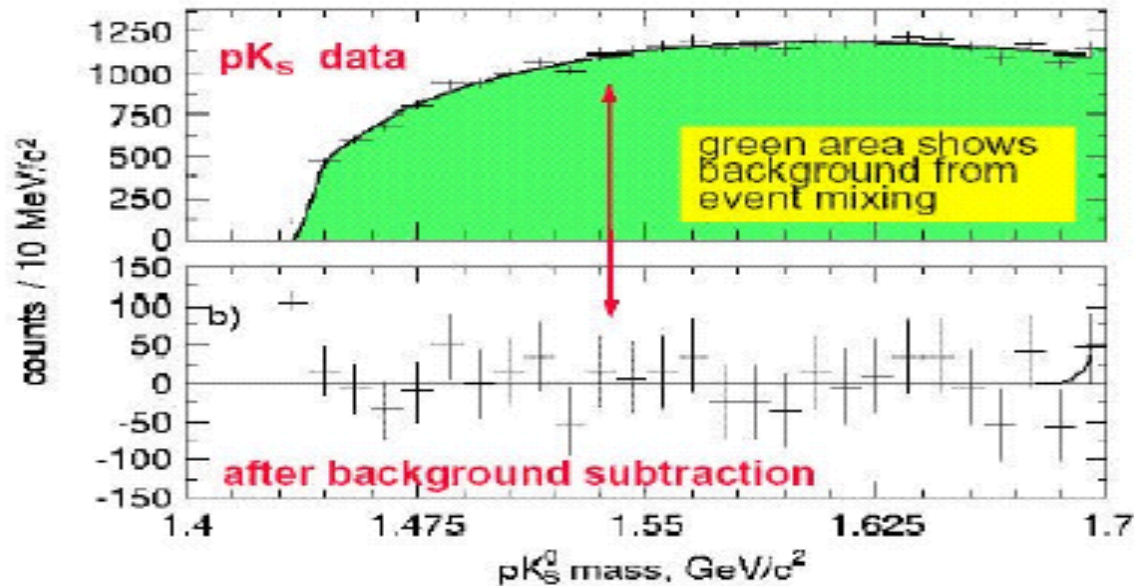
Very few points



Null results

- High energy reactions with hadron beam, HERA-B
- Electron positron colliders

Carbon target



The production mechanism needs to be understood or maybe, the observations corresponds to clusters or resonances

If it exists... is what is expected?

- Theorist predict resonance
- Narrow width of decay 1 MeV
 - None, soliton or quark model predicted.
 - It cannot explain how is produced
 - » LIU, Ko PRC 69 045204 2004
 - » NAM arXIV:nucl-th/0411119 v1 2004
- Unknown parity
 - indirectly, $1/2^+$ but calculations suggests $1/2^-$

Sasaki,PRL , 93,15 (2004)

He,Li PRD 70, 034030 (2004)

Iofe, Oganesian, MAIK (2004)

Others candidates

$$uudd \bar{c} = \theta_c^0$$

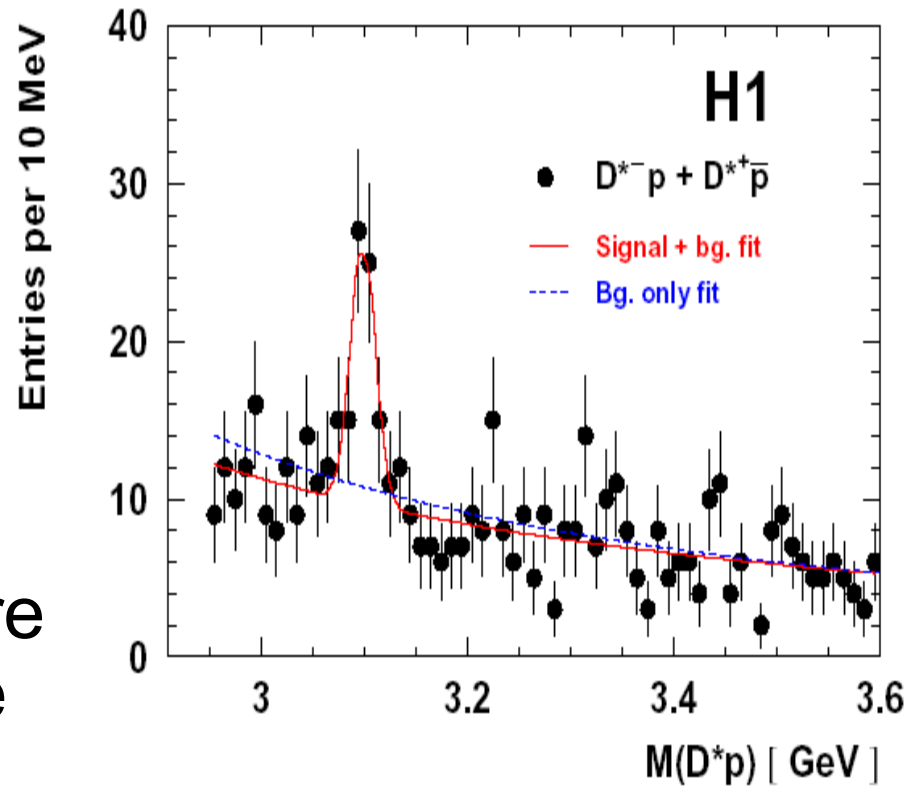
- HERA – DESY (3099).
 $e^- p \rightarrow D^- p$ 8 s.d.
(www.desy.ed)
arXiv:hep-ex/0403017 v1 2004

- ZEUS-DESY **NONE**

• It is much more higher than the threshold DN

$\Xi\pi$

CERN-SPS (arXiv:hep-ph/0411175 v1 12 nov 04)



Suggested experiments to confirm ... or not

- Redone experiments with more statistics
 - More CLASS
 - More CERN
 - COSY-TOF
- Get positive result from high energy experiments or explanation of the pentaquark production.
 - ZEUS