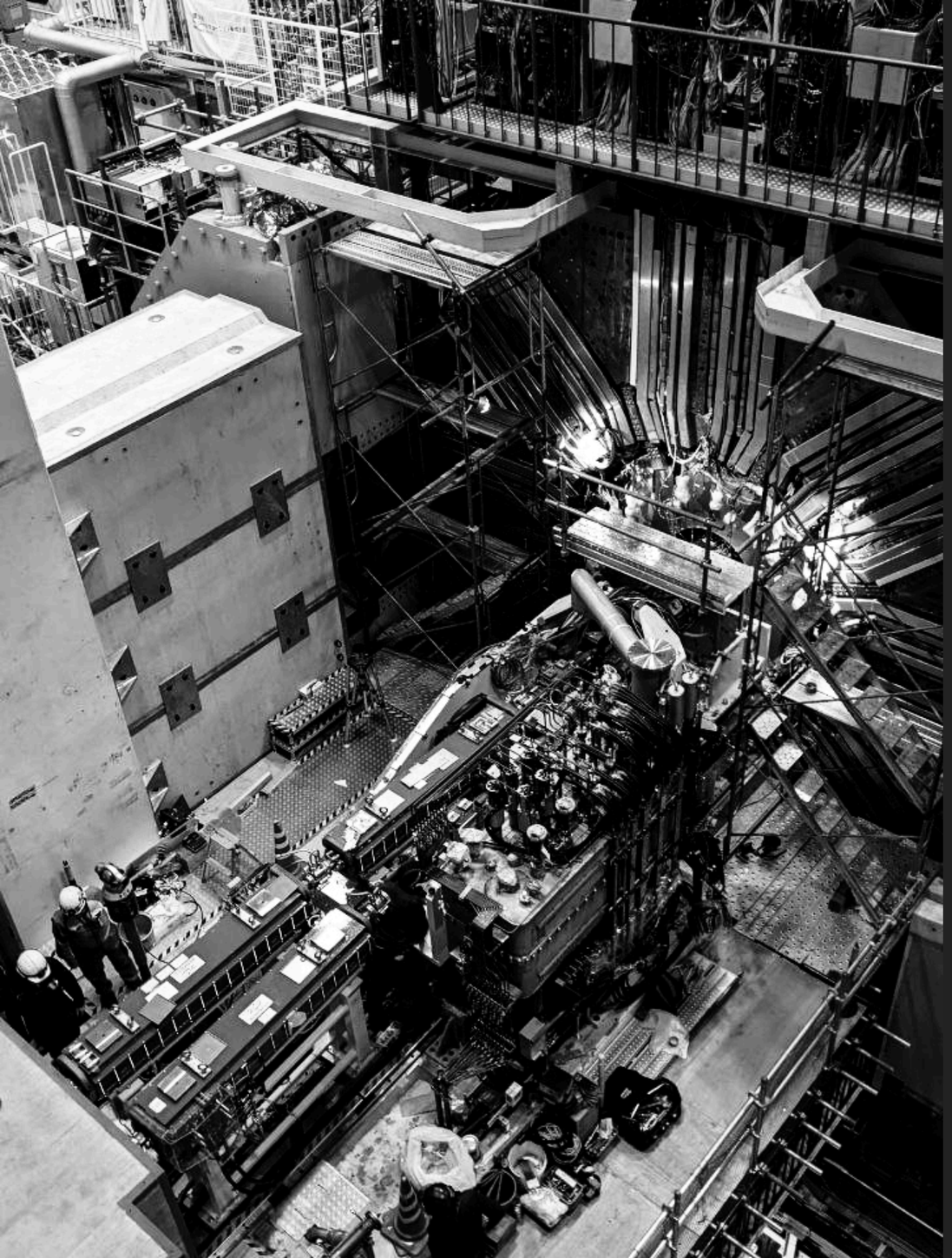
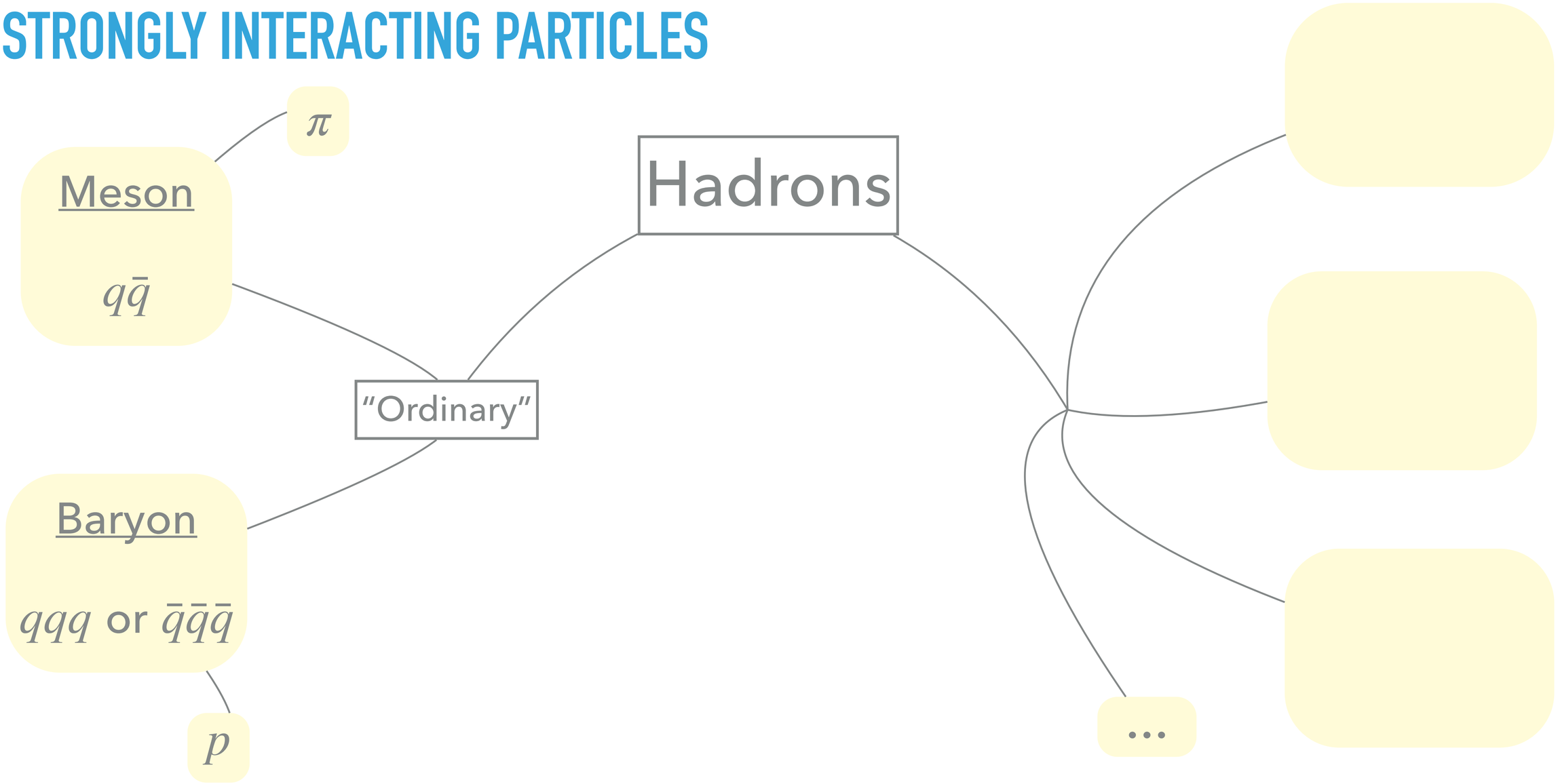


60TH INTERNATIONAL WINTER MEETING ON NUCLEAR PHYSICS

HEXAQUARKS AT BELLE II

FELIX M. KEIL JGU MAINZ

STRONGLY INTERACTING PARTICLES



STRONGLY INTERACTING PARTICLES

Hadrons

"Ordinary"

Meson

$q\bar{q}$

π

Baryon

qqq or $\bar{q}\bar{q}\bar{q}$

p

"Exotic"

...

Tetraquarks

$qq\bar{q}\bar{q}$

Recent discoveries

Pentaquarks

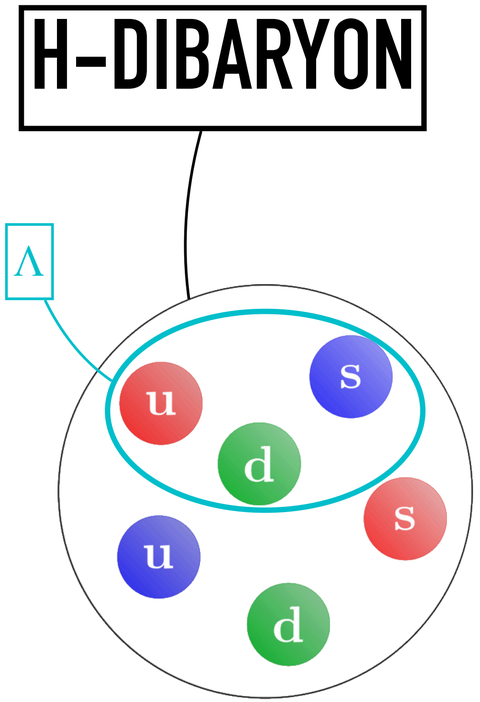
$qqqq\bar{q}$

Hexaquarks

$qqqqqq$

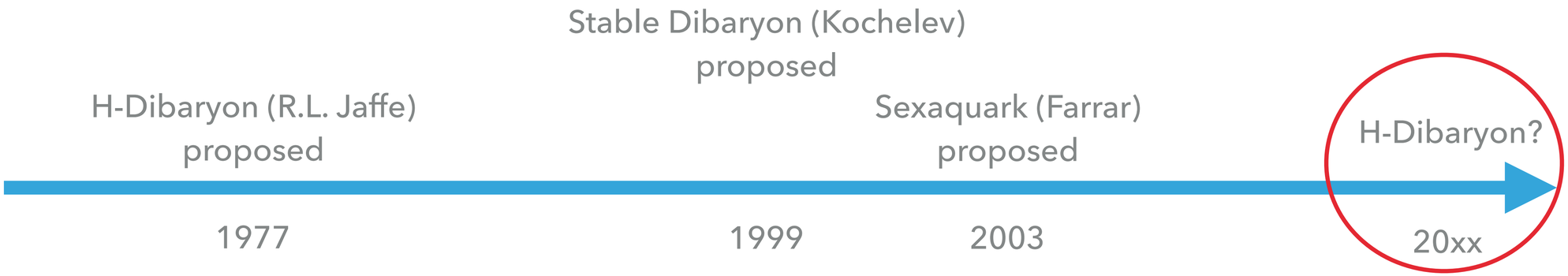
H-Dibaryon?

...



- Doubly strange spinless flavor-singlet six-quark state
- Basically 2x Λ content
- Stable Or Weakly Decaying? - Depends On The Binding Energy!
  - A deeply bound H-Dibaryon might qualify as a dark matter candidate
  - Recent lattice calculations favour a small binding energy ~ 4-7 MeV
- Improve understanding of $\Lambda - \Lambda$ interactions
  - Relevant for neutron stars and double hyper-nuclei
- Many searches, but still awaits to be discovered!

H-DIBARYON TIMELINE



BELLE II = HIGH LUMINOSITY FRONTIER

- Good reconstruction capabilities
- Lots of data (MC and recorded data)
  - MC-Data is labelled
  - Many variables
  - Correlations (higher order)
- Need advanced data analysis techniques
  - Exploit the full potential of the dataset with Machine Learning!

Hexaquarks

Search I'm feeling lucky

Felix M. Keil
Johannes Gutenberg-University Mainz, Germany

THANKS!

TEXT

SUPERKEKB AND BELLE II

- B-Factory
- Electron - Positron Collider At KEK In Japan
- 40x Higher Luminosity Than Its Predecessor
- 2x higher beam current