

# Searching for the H-Dibaryon in J-PARC with a Large Acceptance Hyperon Spectrometer

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Understanding of the hadron-hadron interactions and searching for exotic quark states remain important topics in contemporary hadron physics. The interactions of hyperon-nucleon and hyperon-hyperon systems are important extensions of what we understand about the nucleon-nucleon interaction. The famed yet elusive H-dibaryon, an exotic quark state (uuddss), was predicted several decades ago [1] and also supported by recently Lattice QCD calculations [2]. The E42 experiment has been approved at J-PARC to search for the H-dibaryon with high statistics [3].

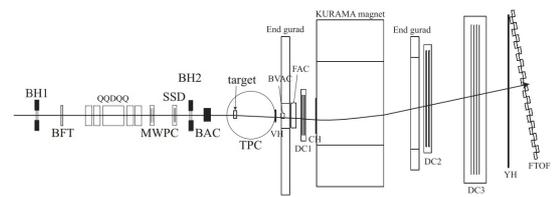


Fig. 1 The top view of E42 setup

The E42 collaboration designed a large acceptance hyperon spectrometer with a time projection chamber for searching the H-dibaryon resonance in  $\Lambda\Lambda$  production from  $(K^-, K^+)$  reaction off nuclei via its following decays. The E42 experiment has high sensitivity both above and below threshold and will be the definitive experiment on the existence of the H-dibaryon, once and for all.

A prototype TPC was built for testing and optimization of various configurations. Simulations on estimation of TPC performance in the electric field and the magnetic field were performed with the Elmer and Garfield++ programs, and are still in progress. A dedicated experiment, scheduled at the Research Center for Electron Photon Science of Tohoku University in June 2014, will be executed for testing of various detectors and design used in the E42 experiment. Recent progress and achievements of the E42 collaboration will be presented.

## References:

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