



14. 9. 30

Prof. H. Noumi
Research Center for Nuclear Physics (RCNP),
Osaka University
10-1, Mihogaoka, Ibaraki, Osaka, 567-0047, Japan

Dear Prof. H. Noumi,

This comes in response to your proposal P50 titled “*Charmed Baryon Spectroscopy via the (π, D^{*-}) reaction (Charmed baryon spectroscopy)*” presented to the 18th meeting of the Program Advisory Committee for the Experiments at the 50-GeV Proton Synchrotron at J-PARC, held on May 14-16, 2014. The committee evaluated the scientific merits and technical feasibility of this proposal and provided the following statement.

P50 (Charmed Baryon Spectroscopy via the (π, D^{-}) reaction (Charmed baryon spectroscopy))*

An updated discussion of the P50 proposal was presented to the PAC. Following the recommendations in the previous PAC report, the collaboration has performed more detailed studies about: i) the theoretical predictions of the $\pi N \rightarrow D^ Y_c$ cross sections and the possible implications of their measurements; ii) a possible enlargement of the physics scope of the experiment.*

H. Noumi has reported the results of a recent study by S.-H. Kim, A. Hosaka and collaborators (arXiv:1405.3445). This theoretical work confirms the reference value of 1 nb for the production of the Λ_c ground state. Moreover, it shows that the ratio of the $\pi N \rightarrow D^ Y_c$ cross-sections for different baryons provides a useful tool to test the description of such baryons in terms of quark-diquark pairs. Such information cannot be accessed in charmed baryon studies performed at e^+e^- and pp colliders.*

As far as the physics goal of the experiment is concerned, the collaboration has presented a preliminary investigation of the physics reach on hyperons (study of $\pi N \rightarrow K^{+} \Lambda/\Sigma$ production cross sections and hyperon decay channels). Surprisingly, the properties of a large fraction of hyperons (in particular the cascade baryons) are still poorly known. These states should be copiously produced at P50. Their systematic investigation would represent a valuable (and “risk-free”) extension of the physics program of the experiment.*

The PAC recognizes the physics interest of this proposal. Given the progress reported by the collaboration in the last two PAC meetings, the PAC agrees to promote P50 to the stage-1 level.


The PAC notes that the collaboration should not underestimate the difficulties posed by the detection of the tiny charmed-baryon signal via the missing-mass technique, which should remain the main goal of the experiment. In addition, the PAC emphasizes the importance of collaborative work with lattice QCD theorists to establish a coherent picture of excited hadrons with charm and strange quarks.

Following the recommendation by the PAC, we assign stage-1 status to the proposed experiment. The following benefits result from stage-1 recognition of the proposal:

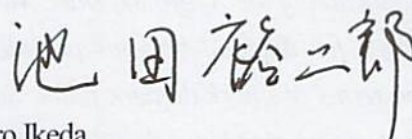
- A. Members may register as J-PARC users and radiation workers.
- B. Limited support will be provided to domestic travel to J-PARC.
- C. Detector R&D may be partially supported by IPNS.
- D. Collaboration can request for offices, work space for R&D, and resource including electricity, cooling water, crane etc.

It should be noted, however, that this recognition does not imply automatic or final approval of the experiment. The experiment will tentatively be known as J-PARC 50-GeV PS experiment E50.

Sincerely,



Masanori Yamauchi
Director
Institute of Particle and Nuclear Physics
KEK



Yujiro Ikeda
Director
J-PARC Center

cc:

PAC members: E. Blucher, T. Browder, A. Dote, M. Grosse-Perdekamp*, J. Haba (Chairperson), K. Imai, K. Inoue, G. Isidori, K. Kleinknecht*, T. Kishimoto*, W. Louis III, T. Nagae*, H. Sakurai, H. Shimizu, W. Weise, W.A. Zajc, S.I. Eidelman, T. Hatsuda, K. Hanagaki

(* invited from the previous committee)