

Final Report to JSA for FY2017 JSA Initiatives Fund
On the Project of
HYP2018, the 13th International Conference on Hypernuclear and Strange
Particle Physics

Project Summary

The 13th International Conference on Hypernuclear and Strange Particle Physics (HYP2018) was successfully carried out from June 24 to 29, 2018, at downtown Portsmouth, Virginia. This conference was the thirteenth one in the series of HYP conferences initiated in 1982 in Heidelberg and held periodically every three years. The conference had been held and rotated in between Japan and Europe (HYP2006 in Mainz, Germany, HYP2009 in Tokyo, Japan, HYP2012 in Barcelona, Spain, and HYP2015 in Sendai, Japan.) since HYP2003 held at Jefferson Lab.

The HYP conference brings together theoreticians and experimentalists working on hadron processes and nuclear systems containing strangeness, from single to multi-strangeness states and from few-body states to massive neutron stars. The topics of the HYP conference have been extended to related fields such as low-energy aspects of QCD, dense and cold matter, as well as hadronic and nuclear systems with heavier flavors, such as charm. By hosting this conference nearby Jefferson Lab, it gave also a maximized exposure on CEBAF facility, its scientific program, and its contribution to the nuclear physics with strangeness.

The conference had 100 participants. The program contains 36 talks in plenary sessions, 13 talks in special two topical sessions, 28 talks in two parallel sessions, and 20 poster presentations. These presentations cover the full range of topics planned for this conference. The detail program can be found in Appendix I.

IF Fund Spending

The awarded \$2,500 was fully spent by providing partial aid in terms of registration fee to seven participants (3 senior and 4 junior scientists). This aid helps to enable their participations and contributions. The detailed name and support record can be found in Appendix II.

Acknowledgement

The PI of this IF award would like to thank the support given by JSA, its IF program committee, as well as Jefferson Lab (Dr. Robert McKeown and staffs in Staff Services). These supports ensured the successfulness of this conference.

Appendix I

HYP2018 Scientific Program and Schedule

Sunday, June 24, 2018

Registration begins at 16:00 until 20:00.

Welcome reception at conference site from 18:00 to 20:00.

The Plenary and Topical Sessions

Monday, June 25, 2018

- 8:00 – 8:30 Continued registration
8:30 – 8:40 Liguang Tang (chair and local organizer), “Opening remark on HYP2018”
8:40 – 9:05 Robert McKeown (JLab deputy director for science), “Welcome address”.
9:05 – 9:15 Prof. John Millener, “Special memory on Prof. Dr. Robert Chrien”.
9:15 – 10:00 Prof. Avraham Gal, “Old and New Problems in Strangeness Nuclear Physics”.
10:00 – 10:20 Break

Session chair: Prof. Benjamin Gibson

- 10:20 – 10:55 Prof. Takashi Inoue, “Hyperon forces from QCD on lattice and their applications”.
10:55 – 11:30 Prof. Zohren Davoudi, “From quantum chromodynamics to hypernuclear interactions”.
11:30 – 12:05 Prof. Thomas A. Rijken, “Extended-soft-core Baryon-Baryon model ESC16”.
12:05 – 14:00 Lunch break

Session chair: Prof. Tullio Bressani

- 14:00 – 14:35 Prof. John Price, “ Λ proton elastic scattering in CLAS”.
14:35 – 15:10 Prof. Laura Fabbriati, “Femtoscopia in pp and pA collisions at GeV and TeV energies as a tool to shed light on the hyperon puzzle”.
15:10 – 15:45 Prof. Benjamin Gibson, “Determine the unknown Λn interaction”.
15:45 – 16:05 Break

Topical Session 1: Neutral Baryonic Systems with Strangeness
(Conveners: Profs. Josef Pochozalla and Emiko Hiyama)

- 16:05 – 16:25 Prof. Josef Pochozalla, “Introduction on neutral baryonic systems”.
16:25 – 16:45 Prof. Humberto Garcilazo, “Neutral Baryonic Systems with Strangeness”.
16:45 – 17:05 Prof. Emiko Hiyama, “Calculations on Ξ_{nn} and Ξ_{nnn} systems”.
17:05 – 17:25 Prof. Susumu Shimoura, “Tetraneutron system populated by double-charge exchange reactions using RI beam”.
17:25 – 17:45 Dr. Jaume Carbonell, “On the possible existence of three and four neutron resonances”.
17:45 – 18:05 Open discussions

Tuesday, June 26, 2018

7:45 – 8:15 Open

Session chair: Prof. Alessandro Feliciello

8:15 – 8:50 Prof. Koji Miwa, “ Σ -p scattering experiment at J-PARC – results of commissioning run”.

8:50 – 9:25 Dr. Natalie Walford, “Recent Measurements of Hyperon Photoproduction Spin Observables in CLAS”.

9:25 – 10:00 Prof. Reinhard Schumacher, “Photoproduction of Λ -Anti- Λ Pairs at GlueX”.

10:00 – 10:20 Break

Session chair: Prof. Avraham Gal

10:20 – 10:55 Dr. Jiangming Yao, “Beyond relativistic mean-field approaches to deformed hypernuclei”.

10:55 – 11:30 Dr. Han-Josef Schulze, “Skyrme forces for Lambda and Cascade hypernuclei”.

11:30 – 12:05 Prof. Isaac Vidana, “Single-particle spectral function of the Λ hyperon in finite nuclei”.

12:05 – 14:00 Lunch break

Session chair: Prof. Tomofumi Nagae

14:00 – 14:35 Dr. Takeshi Koike, “Gamma-ray spectroscopy of single Λ -hypernuclei at J-PARC: The results and future”.

14:35 – 15:10 Prof. Satoshi N. Nakamura, “Spectroscopy of electro-produced hypernuclei at JLab”.

15:10 – 15:45 Prof. Jiri Mares, “Studies of K bar Nuclear Bound States”.

15:45 – 16:05 Break

Topical Session 2: Charge Symmetry Breaking

(Conveners: Prof. Elena Botta and Patrick Achenbach)

16:05 – 16:20 Prof. Elena Botta, “Charge Symmetry Breaking in s- and p-shell Λ -hypernuclei: An updated review”.

16:20 – 16:35 Prof. John Millener, “Shell-model calculations for charge-symmetry breaking in p-shell hypernuclei”.

16:35 – 16:55 Dr. Daniel Gazda, “CSB ab initio calculations of Charge symmetry breaking in light hypernuclei”.

16:55 – 17:15 Dr. Andreas Nogga, “Charge-symmetry breaking in light hypernuclei based on chiral and similarity renormalization group-evolved interactions”.

17:15 – 17:35 Dr. Takeshi Yamamoto, “Future gamma-ray spectroscopic experiment (J-PARC E63) on ${}^4_{\Lambda}\text{H}$ ”.

17:35 – 17:55 Dr. Toshiyuki Gogami, “Latest results from JLab on ${}^7_{\Lambda}\text{He}$ and ${}^{10}_{\Lambda}\text{Be}$ ”.

17:55 – 18:15 Dr. Masahiro Yoshimoto, “Studies for charge symmetry breaking effect in hypernuclei with nuclear emulsion”.

18:15 – 18:30 Prof. Patrick Achenbach, “Reflections on Charge Symmetry Breaking”.

Wednesday, June 27, 2018

7:45 – 8:15 Open

Session chair: Prof. Jiri Mares

8:15 – 8:50 Prof. Petr Bydzovsky, “Electroproduction of p-shell hypernuclei in DWIA”.

8:50 – 9:25 Prof. Toshio Motoba, “Multi-configuration calculation of hypernuclear photoproduction spectra to shed light on new capability”.

9:25 – 10:00 Prof. Emiko Hiyama, “Structure of light p-shell Ξ hypernuclei”.

10:00 – 10:20 Break

Session chair: Prof. Satoshi N. Nakamura

10:20 – 10:55 Prof. Tomofumi Nagae, “Observation of a Ξ bound state in the $^{12}\text{C}(\text{K}^-, \text{K}^+)\text{X}$ reaction at 1.8 GeV/c”.

10:55 – 11:30 Dr. Junya Yoshida, “Status of J-PARC E07: Systematic study of double strangeness nuclei with hybrid emulsion method”.

11:30 – 12:05 Dr. Takehiko Saito, “Present and future hypernuclear spectroscopy with heavy ion beam”.

12:05 – 14:00 Lunch break

Session chair: Prof. Josef Pochozalla

14:00 – 14:35 Prof. Isaac Upsal, “Global polarization of Lambda hyperons in Au+Au Collisions at RHIC”.

14:35 – 15:10 Prof. Benjamin Dönigus, “Highlights of the production of anti-(hyper-)nuclei and exotica with ALICE at the LHC”.

15:10 – 15:45 Dr. Akinobu Dote, “Fully coupled-channel study of K^*pp resonance in a chiral SU(3)-based $\bar{\text{K}}\text{N}$ potential”.

15:45 – 16:05 Break

15:45 – 17:45 **Poster Session**

Thursday, June 28, 2018

Parallel Sessions *See detailed parallel session schedule*

Friday, June 29, 2018

7:45 – 8:15 Open

Session chair: Prof. Makoto Oka

8:15 – 8:50 Prof. Robert Roth, “Ab Initio Hypernuclear Structure Theory”.

8:50 – 9:25 Dr. Diego Lonardoni, “Strangeness in nuclei and neutron stars: many-body forces and the hyperon puzzle”.

9:25 – 10:00 Dr. Stefano Gandolfi, “The EOS of neutron matter, and the effect of Lambda hyperons to neutron star structure”.

10:00 – 10:20 Break

Session chair: Prof. Liguang Tang

10:20 – 10:55 Prof. Alessandro Feliciello, “Study of the (π^- , K^0) reaction on nuclei at J-PARC”.

10:55 – 11:30 Prof. Masahiko Iwasaki, “A quest for the “ K_{pp} ” bound state via $^3\text{He}(K^-, n)$ reaction, J-PARC E1 experiment”.

11:30 – 12:05 Prof. Kristian Piscicchia, “Low Energy Antikaon-nucleon/nuclei interaction studies by AMADEUS”.

12:05 – 14:00 Lunch break

Session chair: Prof. Angels Ramos

14:00 – 14:35 Dr. Jinhui Chen, “Precise measurement on hypertriton and anti-hypertriton mass and lifetime with the STAR Heavy Flavor Tracker”.

14:35 – 15:10 Prof. Gastao Krein, “Charmed hypernuclei and charmed mesons and baryons in nuclear matter”.

15:10 – 15:45 Prof. Bing Song Zou, “Hadron spectroscopy from production and decay of Λ_c and Λ_b ”.

15:45 – 16:05 Break

Session chair: Prof. Reinhard Schumacher

16:05 – 16:45 Prof. Hirokazu Tamura, **Summary**.

16:45 – 17:00 Prof. Liguang Tang, Closing remarks.

The Parallel Session A Program and Schedule

Thursday, June 28, 2018

7:45 – 8:15 Open

Session A1 *Session chair: Prof. Joerg Reinhold*

8:15 – 8:45 Dr. Tongtong Cao, “Determination of Polarization Observables for Final-State Interactions in the Reaction $\vec{\gamma}d \rightarrow K^+\vec{\Lambda}n$ ”.

8:45 – 9:15 Dr. Thomas Jude, “Strangeness photoproduction at extremely forward angles at the BGO-OD experiment”.

9:15 – 9:45 Dr. Sho Nagao, “Feasibility of lifetime measurements on hyperhydrogens with the photon beams”.

9:45 – 10:15 Dr. Florian Hauenstein, “Polarization Observables and p Λ Scattering Length Measured in the $\bar{p}p \rightarrow pK^+\Lambda$ Reaction”.

10:15 – 10:35 **Break**

10:35 – 11:05 Prof. Hiroyuki Fujioka, “ $^5_{\Lambda\Lambda}H$ production experiment by use of $^7_{\Xi}H$ production and decay at J-PARC”.

11:05 – 11:35 Prof. Franco Garibaldi, “Studying Λ interactions in nuclear matter with the $^{208}Pb(e, e'K^+)^{208}_{\Lambda}Tl$ reaction”.

11:35 – 12:05 Prof. Chhanda Samanta, “Binding, bonding and charge symmetry breaking in Λ -hypernuclei”.

12:05 – 13:45 **Lunch break**

Session A2 *Session chair: Dr. Hans-Josef Schulze*

13:45 – 14:15 Dr. Hidekatsu Nemura, “Hyperon-nucleon interaction from lattice QCD at $(m_{\pi}, m_K) \approx (146, 525)$ MeV”.

14:15 – 14:45 Dr. Jaroslava Hrtankova, “ Λ^* - matter: stable or unstable?”

14:45 – 15:15 Dr. Carlos Granados, “Hyperon transition form factors”.

15:15 – 15:45 Prof. Igor Filikhin, “Isospin Given Charge Formalism for Three-Body Nuclear Systems”.

15:45 – 16:05 **Break**

16:05 – 16:35 Dr. Alexander Botvina, “Formation of hypernuclei in relativistic ion, hadron and lepton collision”.

16:35 – 17:05 Prof. Liguang Tang, “Lifetime of medium-heavy hypernuclei – Jlab E02-017 experiment”.

17:05 – 17:35 Dr. Jacek Biernat, “Hypron structure with BESIII”.

The Parallel Session B Program and Schedule

Thursday, June 28, 2018

- 7:45 – 8:15 Open
- Session B1** *Session chair: Prof. Pete Markowitz*
- 8:15 – 8:45 Dr. Hajime Togashi, “Hyperon equation of state for core-collapse simulations based on the variational many-body theory”.
- 8:45 – 9:15 Dr. Isaac Vidana, “Do hyperons exist in the neutron star interior”.
- 9:15 – 9:45 Dr. Lorenzo Contessi, “ $B_{\Lambda}({}^5_{\Lambda}\text{He})$ from short range effective theory”.
- 9:45 – 10:15 Prof. Àngels Ramos, “The constraining effect of isospin filtering reactions in the $S = -1$ sector”.
- 10:15 – 10:35 **Break**
- 10:35 – 11:05 Dr. Jean-christophe David, “Production of strange particles and hypernuclei in nuclear reactions at a few GeV”.
- 11:05 – 11:35 Dr. Philipp Gubler, “Mesons with charm and strangeness in nuclear matter”.
- 11:35 – 12:05 Prof. Luis Trevisan, “The Isospin strange asymmetry from the chiral effective theory”.
- 12:05 – 13:45 **Lunch break**
- Session B2** *Session chair: Prof. Guido Maria Urciuoli*
- 13:45 – 14:15 Prof. Jung Keun Ahn, “Search for an H-dibaryon near $\Lambda\Lambda$ and $\Xi^{-}p$ thresholds at J-PARC”.
- 14:15 – 14:45 Dr. Kiyoshi Tanida, “Possibility of a new narrow Λ^{*} resonance near the $\Lambda\eta$ threshold”.
- 14:45 – 15:15 Dr. Yudai Ichikawa, “ \bar{K} and nucleus system studied by ${}^{12}\text{C}(\bar{K}^{-}, p)$ spectrum”.
- 15:15 – 15:45 Dr. Jinhui Chen, “Search for the N- Ω bound state with the STAR detector at RHIC”.
- 15:45 – 16:05 **Break**
- 16:05 – 16:35 Dr. Hidemitsu Asano, “Spectroscopic study of the $\Lambda(1405)$ resonance via the $d(\bar{K}^{-}, n)$ reaction at J-PARC”.
- 16:35 – 17:05 Dr. Ramona Lea, “Studying the strong interaction for meson-baryon with femtoscopy in pp collisions with ALICE”.
- 17:05 – 17:35 Dr. Kiyoshi Tanida, “Exotic and Conventional Quarkonium Physics Prospects at Belle II”.

HYP2018 Scientific Program and Schedule

Poster Presentations, Wednesday, June 27, 2018

15:45 – 18:05

Bishnu Pandey, “Determining the unknown Λ -n interaction by investigating the Λ_{nn} resonance – JLab E12-17-003”

Dimitar Mihaylov, “Baryon-baryon femtoscopy in pp and p-A collisions”.

Shin Hyung Kim, “Development of the Hyperon Spectrometer for Hadron Physics Experiments at J-PARC”.

Kosuke Itabashi, “Design of a target system for Λ hypernuclear spectroscopy at JLab”.

Manami Fujita, “ Ξ -atom X-ray Spectroscopy (J-PARC E07)”.

Hiroyuki Ekawa, “Search for double hypernuclei with a hybrid emulsion method at J-PARC”.

Shuhei Hayakawa, “Status of double hypernuclei experiment with hybrid emulsion method at J-PARC”.

Takuya Nanamura, “High-resolution spectroscopic study of the Ξ -hypernuclei with S2S spectrometer”.

Yuichi Toyama, “Developments of a detector system for decay pions from light hypernuclei”.

Schafer Martin, “On high-density Λ^* matter”.

Sachio Iwasaki, “Hadronic Paschen-Back effect in charmonium”.

Michael Bölting, “Status of the Hypernuclei and Hyperatom setup at PANDA”.

Michael Bölting, “Continuation of high-precision hypernuclear mass measurements at MAMI”.

Noraim Nunez, “Observation of Λ -p elastic scattering in the CLAS detector”

Luis Trevisan, “The Nucleon Strange asymmetry from the nonextensive statistics”.

Jesmin Nazeer (Hampton University), “Development of a GEM telescope”

Angel Christopher (Hampton University), “GEANT4 simulation for a LHe-TPC thick-GEM based target”.

Thir Gautam (Hampton University), “Precision Measurement of the Proton Elastic Cross-Section at High Q^2 ”.

Debaditya Biswas (Hampton University), “New Physics Search with the TREK/E36 experiment at J-PARC”

Appendix II

The \$2,500 IF fund was spent on registration fees for the following participants:

1. Prof. Tullio Bressani (senior)	\$375	INFN – Sezione di Torino, Italy
2. Prof. Avraham Gal (senior)	\$375	Racah Institute of Physics, The Hebrew University, Israel
3. Prof. Humberto Garcilazo (Senior)	\$375	Escuela Superior de Fisica Y Matematics, Instituto Politecnico Nacional, Mexico
4. Dr. Hans-Josef Schulze	\$375	INFN Catania, Italy
5. Dr. Akinobu Dote	\$375	KEK Theory Center/IPNS, Japan
6. Dr. Petr Bydzovsky	\$375	Nuclear Physics Institute, Czech Technical University, Czech Republic
7. Dr. Natalie K. Walford (Postdoc)	\$250	University of Basel, Switzerland