Miroslav Furić and Ed V. Hungerford
for HNSS Collaboration:

High Resolution Spectroscopy of the $^{12}_{\Lambda}$B Hypernucleus Produced by the (e,e'K) Reaction

2nd INTERNATIONAL CONFERENCE ON
NUCLEAR AND PARTICLE PHYSICS
WITH CEBAF AT JEFFERSON LAB
Dubrovnik, 26 - 31 May 2003

HNSS collaboration

High Resolution Spectroscopy of the $^{12}_{\Lambda}$B Hypernucleus Produced by the (e,e'K$^+$) Reaction

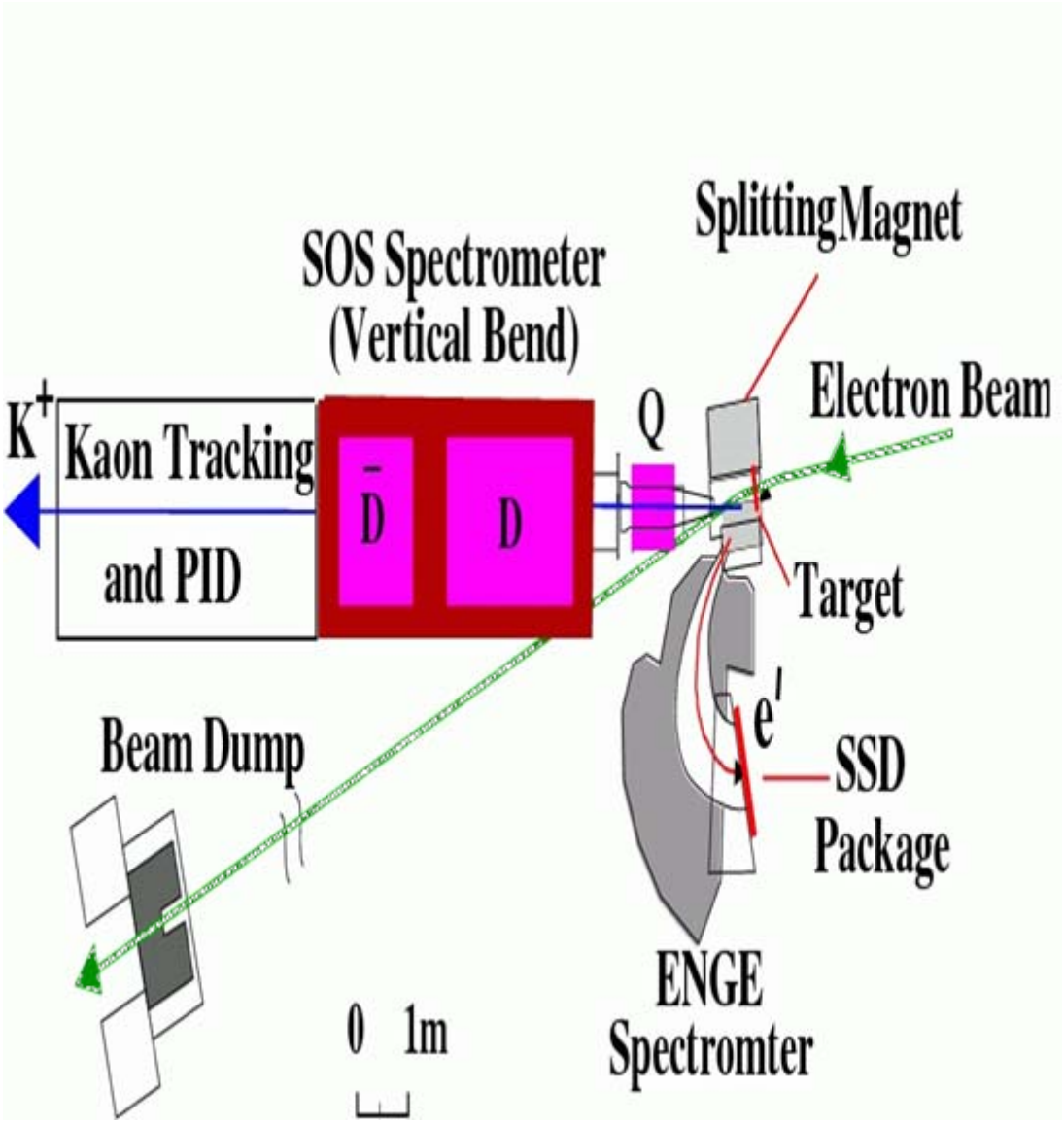
T. Miyoshi[a], M. Sarsour[b], L. Yuan[c], X. Zhu[c], A. Ahmidouch[d], P. Ambrozewicz[e], D. Androic[f], T. Angelescu[g], R. Asaturyan[h], S. Avery[c], O.K. Baker[c,j], I. Bertovic[f], H. Breuer[i], R. Carlini[j], J. Cha[c], R. Chrien[k], M. Christy[c], L. Cole[c], S. Danagoulian[d], D. Dehnhard[l], M. Elaasar[m], A. Empl[b], R. Ent[j], H. Fenker[j], Y. Fujii[a], M. Furic[f], L. Gan[c], K. Garrow[j], A. Gasparian[c], P. Gueye[c], M. Harvey[c], O. Hashimoto[a], W. Hinton[c], B. Hu[c], E. Hungerford[b], C. Jackson[c], K. Johnston[o], H. Juengst[l], C. Keppel[c], K. Lan[b], Y. Liang[c], V.P. Likhachev[p], J.H. Liu[l], D. Mack[j], A. Margaryan[h], P. Markowitz[q], J. Martoff[e], H. Mkrtchyan[h], S. N. Nakamura[a] T. Petkovic[f], J. Reinhold[q], J. Roche[r], Y. Sato[a,c], R. Sawafta[d], N. Simicevic[o], G. Smith[j], S. Stepanyan[h], V. Tadevosyan[h], T. Takahashi[a], K. Tanida[s], L. Tang[c,j], M. Ukai[a], A. Uzzle[c], W. Vulcan[j], S. Wells[o], S. Wood[j], G. Xu[b], H. Yamaguchi[a], C. Yan[j]

(HNSS Collaboration)

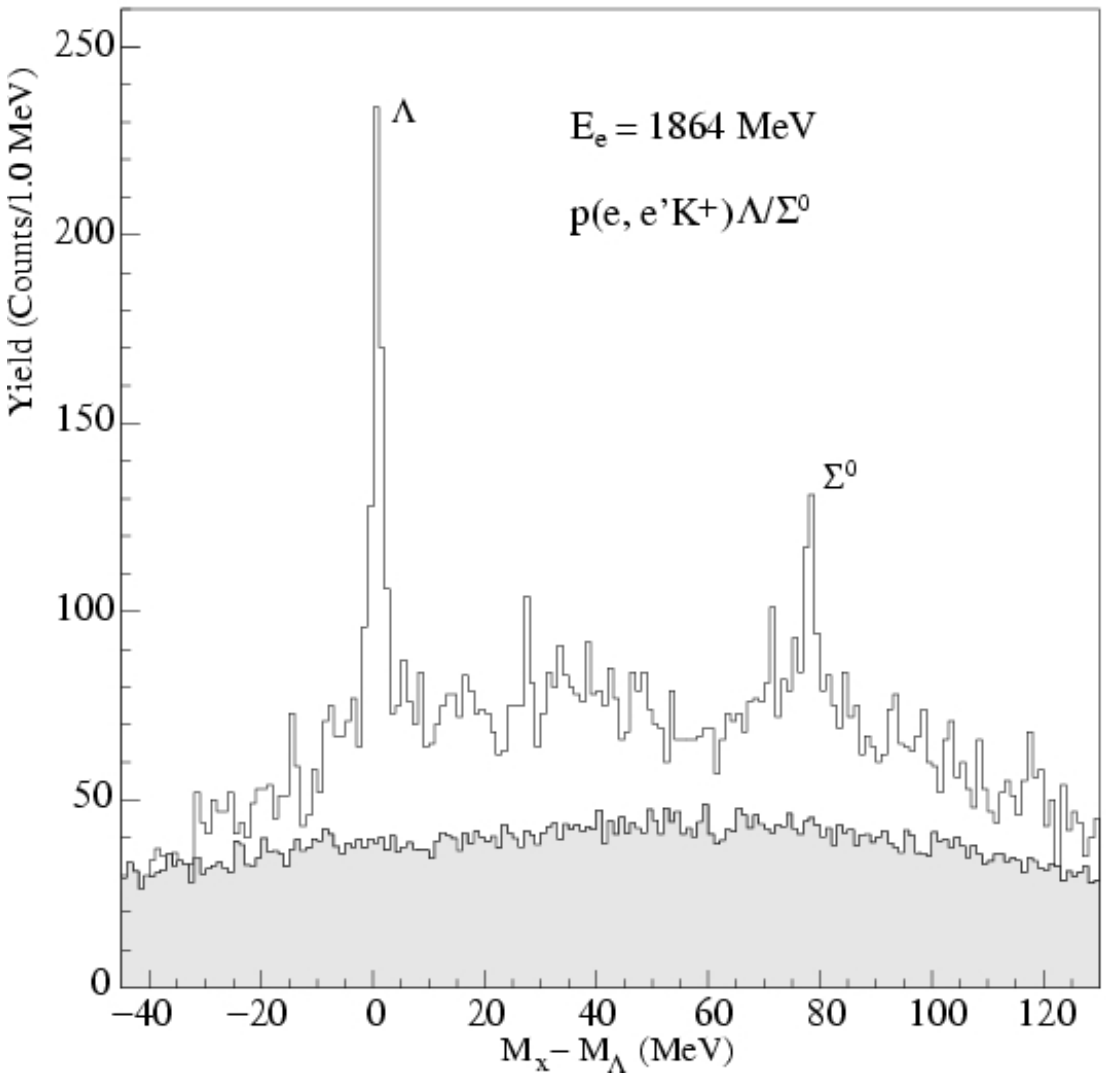
[a] *Tohoku University, Sendai, 980-8578, Japan;*
[b] *University of Houston, Houston, TX 77204;*
[c] *Hampton University, Hampton, VA 23668;*
[d] *North Carolina A&T State University, Greensboro, NC 27411;*
[e] *Temple University, Philadelphia, PA 19122;*
[f] *University of Zagreb, Zagreb, Croatia;*
[g] *University of Bucharest, Bucharest, Romania;*
[h] *Yerevan Physics Institute, Yerevan, Armenia;*
[i] *University of Maryland, College Park, MD 20742;*
[j] *Thomas Jefferson National Accelerator Facility, Newport News, VA 23606;*
[k] *Brookhaven National Laboratory, Upton, NY 11973;*
[l] *University of Minnesota, Minneapolis, MN 55455;*
[m] *Southern University at New Orleans, New Orleans, LA 70126;*
[n] *Rensselaer Polytechnic Institute, Troy, NY 12180;*
[o] *Louisiana Tech University, Ruston, LA 71272;*
[p] *University of Sao Paulo, Sao Paulo, Brazil;*
[q] *Florida International University, Miami, FL 33199;*
[r] *College of William and Mary, Williamsburg, VA 23187;*
[s] *University of Tokyo, Tokyo 113-0033, Japan*

High energy CW electron beams at new accelerator facilities allow electromagnetic production and precision study of hypernuclear structure, and we report here on the first experiment demonstrating the usefulness of the (e,e'K$^+$) reaction. This experiment is also the first to take advantage of the enhanced virtual photon flux available when electrons are scattered at approximately zero degrees. The observed resolution, $\sim$ 900 keV, of the $^{12}_{\Lambda}$B spectrum is the best yet attained using magnetic spectrometers. The positions of the major excitations are in agreement with theoretical predictions and the previous binding energy measuremen

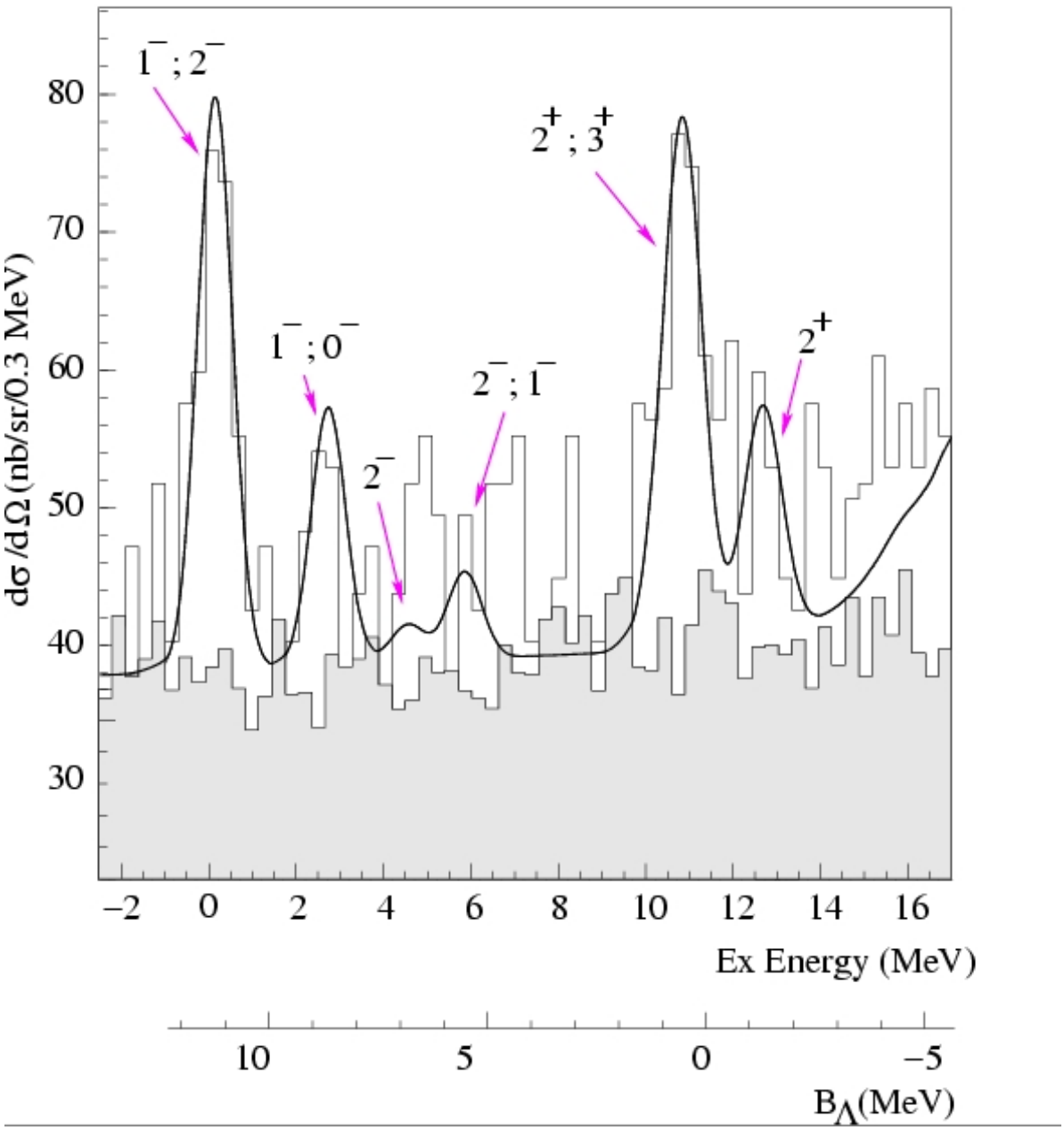
The experimental view plan showing booth the kaon spectrometer (SOS) and the electron spectrometer (ENGE) spectrometer



Missing mass spectrum obtained from CH_x Target at incident electron energy of 1864 MeV



The summed $^{12}_{\Lambda}$B missing mass spectrum



Conclusions:

- First kinematically complete Hypernuclear Electroproduction demonstrated
- Resolution superior to hadronic processes
- (e,e´K^+) complementary to ($K^\pm$,$\pi^\pm$) and time reversed channels
- Will possibly encounter need for explicit inclusion of quarks
- Need to continue these unique studies at unique place