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NUCLEAR SCIENCE DIVISION NEWSLETTER
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Associate Director: Bernard G. Harvey Editor: Jeannette Mahoney

Report from Bernard Harvey

The Nuclear Science Division's 1979 Advisory Committee will consist of the following members : Luciano Moretto, chairman, Stretch Conzett, David Scott and Wladek Swiatecki. As always, I look forward to working closely with the Committee in the discussion of scientific priorities, budgets, and many many more subjects.

Director Andy Sessler has issued an invitation to all members of the Nuclear Science Division to discuss with him their thoughts about the appointment of a new Division Head. Call 5111 to make arrangements. If you prefer, you can, as always, talk to me. I promise to pass on your ideas to Andy. It's important that everybody be heard so that the new Division Head can feel assured that his appointment was a true consensus.

New members of the Nuclear Science Division Visiting Committee are Prof.'s Herman Feshbach (MIT), and Stanley S. Hanna (Stanford). One more new appointment remains to be made. The tentative date for the Committee's visit is March 15-16, 1979, but that could change. Returning members are: J. Rayford (Ray) Nix (LASL), Prof. T. Sugihara (Texas A&M), and P. Stelson (ORNL).

Formation of the NSD Instrumentation Committees

Doug Greiner has decided that two committees, one dealing with relativistic and the other with non-relativistic regions, should be formed to recommend development of specific detectors and instrumentation systems.

For the relativistic area he has selected Hank Crawford, chairman, Fred Bieser, Jim Carroll, Chuck Gruhn, Shoji Nagamiya and James Symons. The first concern of this committee will be to recommend detector systems for the HISS facility, and they will also be considering instrumentation for the effective use of the heavy beams to be provided by the upgraded Bevalac.

The members of the non-relativistic committee have not yet been selected and Doug would appreciate any recommendations that people may have for

physicists and engineers who have current active knowledge of the field and a feeling for what types of measurements will provide the greatest scientific impact in the future.

Workshop on Relativistic Nuclear Collisions

The first workshop on Ultra-Relativistic Nuclear Collisions will be held on May 21-24 of 1979 at LBL. It will be sponsored jointly by LBL and Gesellschaft für Schwerionenforschung.

In this workshop the participants will explore the range of physical phenomena and processes that could be studied using ultra-relativistic nuclear beams ($E \gtrsim 10$ GeV/A, up to $^{238}U + ^{238}U$). Their objectives will be

1. To go beyond the existing high energy hadron-nucleus and cosmic ray data and isolate and review those aspects of hadronic processes (e.g., the A dependence of high $p_\perp$ and collective production processes) that are unique to collisions involving nuclear targets.

2. To examine how the physics and systematics of those processes could be further clarified or extended by using nuclear projectiles as well as targets. Special focus will be placed on whether ultra-relativistic nuclear collisions could provide novel tests for quantum chromodynamics.

3. To survey current speculations on possible exotic phenomena such as vacuum excitations or quark phase transitions that may occur with nuclear collisions.

The Organizing Committee consists of Miklos Gyulassy and Lee Schroeder, co-chairmen; Alan Axelrod, Hans Gutbrod and Arthur Poskanzer. Information regarding this workshop can be obtained from the ARC Office, which will be sending out notices in the near future.

Ceremonies for New Theory Wing

On Friday November 17, groundbreaking ceremonies were held on the lawn between Bldg. 70 and the Cafeteria for the new Theory Wing. Wearing an appropriately labeled hard hat and wielding a shovel clearly marked with instructions, Norman Glendenning started off the ceremony by overturning a spadeful of (previously softened) dirt. He was followed in rapid succession by Earl Hyde, Bernard Harvey, Glenn Seaborg and Bill Myers (the master of ceremonies). Bernie refused to turn over his plot until he was allowed to wear the hat, and there was a brief flurry during the picture-taking when Seaborg inadvertently blocked Earl Hyde from view, but in general it all went well. Earl, in fact, displayed a remarkable skill with the shovel, which he modestly attributed to his experience in the Director's Office.

The speeches didn't amount to much and soon both participants and spectators moved down to room 191 for refreshments. Sartorially, the group was undistinguished, with the notable exception of Peter Lindstrom and Earl Hyde, who were resplendent in their new HISS tee shirts (which can be obtained from Margret Banks at $5 apiece). All in all, I think most would agree that the high point of the ceremony was the party following it.

ARRIVALS AND DEPARTURES

ARRIVALS

Hans Ritter from the University of Marburg will be here for two years working with the Poskanzer/Gutbrod group.

Loren Richardson, Carolyn Albiston and Steven Blau are new graduate students with the Moretto group.

DEPARTURES

Henriette Faraggi has returned to the Department de Physique Nucleaire, CEN de Saclay, Orme des Merisiers, B.P. No. 2, 91190 Gif-sur-Yvette, FRANCE, after spending 7 months doing experiments at the Bevalac and the 88-Inch Cyclotron with the Scott group.

SEMINARS — NSD Monday seminars, 4:00 p.m., 70A-3377

Dec. 4	Cancelled
Dec. 11	Student talks - TO BE ANNOUNCED
Dec. 18	Darleane Hoffman (LBL) "Neutron Multiplicity Measurements of Cf and Fm Isotopes"

REPORTS

LBL 7194	Coupled Channel Alpha Decay Theory for Even- and Odd-Mass Light and Heavy Nuclei Elizabeth A. Rauscher
LBL 7714	Radiochemical Studies of Neutron Deficient Actinide Isotopes Kimberly Eve Williams

LBL 7718 Implications of the Target Residue Mass and Charge Distributions in the Interaction of 8.0 GeV ^{20}Ne with ^{181}Ta
D. J. Morrissey, W. Loveland and G. T. Seaborg

LBL 7735 Cryogenic Vacuum Pumping at the LBL 88-Inch Cyclotron
D. Elo, D. Morris, D. J. Clark and R. A. Gough

LBL 7737 Recent Developments in High Charge State Heavy Ion Beams at the LBL 88-Inch Cyclotron
R. A. Gough, D. J. Clark, L. R. Glasgow

LBL 7738 Cyclotron Design Studies for a Medical Ion Accelerator
G. U. Behrsing, D. J. Clark, E. H. Hoyer, C. W. Leemann, F. Voelker, R. B. Yourd

LBL 8372 Completion of the Mass 20 Isospin Quintet by Employing a Helium-Jet Fed On-Line Mass Separator
D. M. Moltz, J. Äystö, M. D. Cable, R. D. von Dincklage, R. F. Parry, J. M. Wouters and Joseph Cerny

LBL 8374 Incomplete Momentum Transfer in Peripheral Heavy Ion Collisions at 20 MeV/A
P. Dyer, T. C. Awes, C. K. Gelbke, B. B. Back, A. Mignerey, K. L. Wolf, H. Breuer, V. E. Viola, Jr., W. G. Meyer

RESEARCH

Bevalac News

The Bevatron floor changes are now underway and when complete will have made room for three new facilities - HISS, the Heavy Ion Spectrometer System, LEBL, the Low Energy Beam Line, and a new 4-Pi solid angle detector - as well as the relocated zero-degree spectrometer.

THe HISS magnet is a 500 ton superconducting dipole with a 30 KG field and a large solid angle which will be used by both LBL and outside experimenters to perform multi-particle correlation experiments as well as high-resolution low energy work.

The LEBL, located near the exit of the beam from the Bevatron, will be capable of delivering high quality beams with energies less than 250 MeV/A. With the use of degraders, running the Bevatron at as low an energy as possible will provide beams of energies down to 30 MeV/A which just reach the upper energy available at the 88-Inch Cyclotron, giving LBL an almost continuous range of energies for heavy ions. It will be used for the extension of present low (about 20 MeV/A) energy experiments (e.g., elastic scattering and deeply inelastic collisions) up to Bevalac

energies, covering a region in which several phenomena are expected to show a transition from low energy to high energy characteristics.

The new 4-Pi solid angle detector system is the project of a GSI-Marburg-LBL collaboration and will employ approximately 650 separate detectors capable of identifying each particle. Coupled with a downstream array to measure projectile-like fragments, this device will make possible the measurement of practically all the charged particles emerging from relativistic heavy ion reactions.

The zero-degree spectrometer will become a general facility for forward-angle spectrometer measurements, cosmic ray instrument calibrations, fragmentation studies, and emulsion exposures.

SuperHILAC News

Gamma Ray Anisotropy in Deep-Inelastic Reactions

P. Aguer, R. Diamond, C. Ellegaard, F. S. Stephens, D. Habs, D. Hillis, C. Roulet, G. J. Wozniak, R. P. Schmitt, G. J. Mathews and L. G. Moretto

In a deep-inelastic reaction, the angular momentum is expected to be oriented perpendicular to the reaction plane. If the product nuclei dispose of their angular momentum primarily by stretched E2 decay, then there should be a large difference in the number of gammas detected out-of-plane and in-plane. Thus, the observation that several deep-inelastic reactions show rather weak anisotropies for continuum gamma rays is surprising. These weak anisotropies might be due to a large mixture of gamma rays of other multipolarities or to a loss of alignment of the fragment's intrinsic angular momentum with the reaction plane.

In order to isolate the cause of the weak anisotropies, we have studied a deep-inelastic reaction, 1050 MeV ^{136}Xe + ^{197}Au, where we expect the symmetric products ($_{67}Ho^{160}$) nuclei to decay overwhelmingly by stretched E2's. The $_{67}Ho^{160}$ nuclei are known to be good rotors and via (HI,Xn) reactions have been shown to decay mainly by stretched E2 transitions at the excitation energies and spins (J) that are expected to be formed in deep-inelastic collisions.

In our experiment, both the projectile and target-like nuclei were detected with two large area X-Y position sensitive detectors. The coincident gamma rays were observed with four 3X3" NaI detectors, two of which were positioned in and two above the reaction plane. A preliminary analysis with rather large mass windows indicates that the continuum gamma rays are isotropic to within 20%. Further analysis is proceeding where the masses of the reaction products will be extracted so that mass windows can be set around the symmetric products which we believe have decayed primarily by stretched E2 transitions.

88-Inch Cyclotron News

Space Study at 88

A team of scientists from Aerospace-Space Science Lab used various low energy beams at the 88-Inch Cyclotron this month to calibrate detectors for a space shot in January.

Bern Blake, Janet Luhmann, Norm Katz and Al Kolasinski ran beams of carbon, oxygen and magnesium at energies of about 4 MeV down to nearly 1 MeV. These were used to calibrate a telescope of thin Si detectors for an experiment to measure the elemental composition of ions geomagnetically trapped in the outer zone of the earth's radiation belts, which lie from about 2.5 to 8 earth radii from the the earth's center. As the satellite orbits the earth it spins about its axis, enabling the detectors to get a 360 degree angular distribution of the different charged particles circling the field lines at various points along the orbit. By measuring both the elemental composition and the pitch angles of these charged particles the experimenters hope to be able to infer their origin.

The USAF satellite containing their instruments as well as many others for related experiments is called SCATHA - Spacecraft Charging At High Altitudes - and will be lauched the end of January, 1979.

In January the same group plans another experiment at 88 in which they will simulate the effect of cosmic rays on satellite-borne computer circuitry, using a beam of Ar at different energies. For some time it has been suspected that cosmic rays can cause random bit flips in outer space and in an earlier experiment at the Bevalac using Fe beams of a few hundred MeV/A the Aerospace researchers were able to demonstrate this effect. They decided to do future experiments at 88 because of the lower cost and the ability to change energies easily. In the next run they intend to test different types of micro-circuitry looking for a difference in response in the hope of finding a way to minimize or even eliminate the effect.

Editor's Note: This issue of the NEWSLETTER was created on a Wang Word Processor currently being used by the Goulding group. The Nuclear Science Division expects to receive their own shortly, to be used mainly for personnel record maintenance and mailing lists, and subsequent NEWSLETTERS will also be produced on it. The editor wishes to thank Vickie Donelson for her help and patience in allowing us the use of her Word Processor.

NSD NEWSLETTER

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