Rutherford Laboratory

17-24 April 1972

bulletin 14

FOURTH INTERNATIONAL CONFERENCE ON HIGH ENERGY COLLISIONS - ST CATHERINE'S COLLEGE OXFORD 5 TO 7 APRIL 1972

The fourth International Conference on High Energy Collisions, in the Stony Brook Series initiated by C N Yang at the State University of New York at Stony Brook in 1966, was held April 5 - 7 in Oxford. It was organised by the Rutherford Laboratory.

These conferences are intended to provide a meeting place where physicists, who are particularly interested in what happens when two elementary particles collide at high energies, can come together to hear and discuss recent experimental results and ideas. Very crudely, by "high energies" one means that the kinetic energy of the projectile is rather large compared to the energy of any known energy levels or structure in the combined system of the two colliding particles (e g large compared to the mass of a proton). It is useful to think about two types of collisions $a + b \to c + \ldots$ and $a + b \to c + d$. In the first ("inclusive" reactions) one detects one or more particles (c) and sums over an arbitrary number of others, represented by the dots. In the second ("exclusive" reactions) one detects a definite final state, say particles c and d.

This conference was dominated, in both the experimental data presented and in the theoretical work discussed, by the study of inclusive reactions of the simplest sort, $a + b \to c + \ldots$, where one detects just one particle and sums over all the rest. Furthermore, because of the CERN Intersecting Storage Rings (ISR) it was dominated more than perhaps any meeting in recent years by results from European groups. Although ISR results were beginning to appear almost a year ago, the experimenters have clearly got complete control of the new machinery and the modified detection techniques required and the ISR has come of age. The ISR can take us to much higher energies than before via the collision of two beams of protons rather than hitting a stationary target with a moving beam. Thus it will tell us how collision probabilities behave when the total energy is very large compared to the masses of any known particles. It has already told us something important about inclusive reactions, namely if one knocks apart two protons in a collision the probability (suitably defined) of finding some other particle such as a pion described by a certain set of variables is unchanged whether the energy available in the collisions is just a few times the energy contained in the particle masses or an order of magnitude more. This need not have been so and will tell us something about the structure of the proton; this property is called "scaling". It has been discussed by a number of people in the last ten years though the study of the conditions under which it is true and its implications has expanded very much in recent years following the speculations of R P Feynman and C N Yang.

The study of inclusive reactions is, loosely speaking, somewhat like thermodynamics in that one averages over many particles and many variables (though not too many - the average multiplicity of particles per collision at the highest ISR energies, while still a topic of some controversy, is about fifteen). In the study of two body reactions, on the other hand, one tries to determine the detailed dependence of the scattering amplitude in all variables (energy, scattering angle, polarisation). However, in recent years essentially all simplifying ideas in this field have turned out to be oversimplified and require significant modification. Although over a third of the time at the meeting was spent on recent results and approaches in two body reactions, it was mostly data and considerations of a detailed nature, whose implications are not clear. The most novel was again from the ISR, where intriguing data on the pp total and differential cross sections at high energy have been obtained. The differential cross section shows a dramatic change in shape at a momentum transfer independent of the energy, and the total cross section for a collision of two protons appears not to change with energy at all.

The participants usually enjoy these meetings very much, particularly the chance to argue with workers in one's own field from other places and the chance to get up to date in related fields. I think a common impression at this meeting was that, while there may be signs of increased understanding in all areas, we have far enough to go that there will need to be several more such meetings in the future.

(Reported by G L Kane, Rutherford Laboratory and University of Michigan, and preprinted from Nature by kind permission of Macmillan Journals Ltd).

BULLETIN NOTICE

The current issues of the Bulletin will appear weekly until further notice.

INTERNAL EVENTS

SPECIAL FILM SHOW
Friday 14 April
11.30 a m
Lecture Theatre

A 20 minute film showing "Recent progress on building the TRIUMF cyclotron" will be introduced by:

Dr M K Craddock/University of British Columbia and ex RHEL

NIMROD LECTURE SERIES
Monday 17 April
11.30
Lecture Theatre

"Systematic features of particle exchange amplitudes"

Dr V Barger/Wisconsin

HEP DISCUSSION GROUP
Wednesday 19 April
11.00 a m
Conference Room Building R1

"Isopin Analysis of $np \rightarrow n\Sigma K$ and $np \rightarrow n\Lambda K$"

Dr J Charlesworth/RHEL

SEMINARS IN COMPUTING
Friday 21 April
11.00 a m
Conference Room Building R12

"Fleet Scheduling"

I M Cheshire/AERE

Planning the operations of a dry cargo fleet is an ideal computer problem. The speaker will describe the problem and its solution.

NUCLEAR SEMI-CONDUCTOR SEMINAR
Friday 21 April
1000-1600
Lecture Theatre

Arrangements by The Athena Marketing Company Egham. Further details from the Editor

OVERSEAS VISITS

Messrs N M King & M R Harold to CERN 15-28 April to attend Spring Study of Accelerator Theory at CERN. Mr A R Mayhook to Nijmegen 16-17 April to attend meeting of SEAS TSO Committee. Mr M J Hotchkiss to CERN 16-21 April to work on S120 Experiment. Messrs J R M Maidment, C W Planner, M H R Donald and Mrs J V Trotman to CERN 16-28 April to attend Spring Study of Accelerator at CERN. Dr M M Curtis to Nijmegen 16-22 April and Dr R Taylor 17-22 April to attend Spring Technical Meeting of SEAS.

FILM SHOW

There will be no film shows this week.

MISSING EQUIPMENT

A Columbus Dixon Floor Polisher and attachments Makers No EJ14499. Anyone with information of the present whereabouts of this machine is asked to contact Mr J Marshall Building R1 Ext 6693.

FOUND

In the Blue Car Park - a bunch of keys and a pair of spectacles. Enquiries to Mrs C E Smith Room 2.50 Building R1 please.

CORRESPONDENCE

A letter addressed to Dr L Auerbach Rutherford Laboratory is held by the Editor.

FILM BADGE NOTICE

Period 5 commences Monday 17 April, Colour Strip BLUE for $\beta\gamma$ films and fast neutron packs. Please change your dosimeters promptly and return the old ones. Any person requiring a new $\beta\gamma$ holder please contact Mrs J Coates Ext 430.

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AERE HORTICULTURAL SOCIETY

Renewal of membership is due (15p). If you wish to join the Society please contact Mrs W M Dance Building R1 Ext 418.

CHRISTIAN FELLOWSHIP

Friday 21 April at 12.30 p m in Conference Room Building R12. Frank Smith (Accounts Section) will D V lead Bible Study on Second Epistle of Corinthians Chapter 6. All are welcome to join us.

EXTERNAL EVENTS

THE THIRD COCKCROFT LECTURE
Monday 17 April
5.45 p m
The Institution of Civil Engineers
1/7 Great George Street
Westminster SW1

The future of Nuclear Particle Accelerators

Dr J B Adams Director CERN

Admission by ticket only. A limited number of tickets are available from the Editor.

THEORETICAL PHYSICS SEMINAR
Tuesday 18 April
2.00 p m
Conference Room Building 8.9
AERE

"The Application of Semi-empirical MO methods to Solid State Calculations

Dr M R Hayns/(AERE)

DARESBURY LECTURE SERIES
Tuesday 18 April
2.30 p m
Daresbury Laboratory

"Report on the Oxford Conference"

R Meunier/(CERN)

THEORY DIVISION COLLOQUIUM
Wednesday 19 April
2.00 p m
Room G8 Building E6
Culham Laboratory

"Science and Technology in Industrial Innovation"

Dr M Gibbons/University of Manchester

NUCLEAR PHYSICS DIVISION COLLOQUIUM
Friday 21 April
2.30 p m
Conference Room Hangar 8
AERE

"Violation of the Barshay-Temmer theorem in reaction $^{4}He\ (d,{}^{3}He)t$"

Dr E E Cross/Oak Ridge and Neils Bohr Institute

FORTHCOMING EVENT

Open Days - National Physical Laboratory - 10 and 11 May 1972

RUTHERFORD LABORATORY BULLETIN *Published by the Scientific Administration Group*

Acting Editor: F HARDEN
Room 40 Building R20
Rutherford Laboratory
Chilton Didcot Berks
Abingdon 1900 Ext 6114

Deadline for Insertions	GENERAL & SOCIAL NEWS	INTERNAL & EXTERNAL EVENTS
	Tuesday 1600	Wednesday 1200

pmr

SOCIAL NEWS

FOLK CLUB

Folk Club - Rutherford and Atlas Recreation Society - every Friday at 8 p m in R22 Coffee Lounge. Licensed bar. Admission 20p.
Friday 14 April. "OAK":- 2 boys and 2 girls playing anglo-concertina, melodeon, fiddles and tambourine. English country music. "OAK" can also be heard on Sunday 16 April on Radio 2, 'Folk on Sunday' at 4 p m.
Friday 21 April. "The Songwainers". 3 lively lads from Cheltenham in 3 part harmony.
Appearing in the near future:- George Drawn and Maria Ross - Guitars & Harmonicas.
Roger Sutcliffe - Blues guitarist.
Dick Gaughan - Scottish traditional.
Pete and Ali Nalder - sings anything you want.
Tony Capstick - Mainly Lancashire Industrial songs.
Further information obtainable from the Club Secretary, Stephanie Hannan R22.

SEVEN-A-SIDE SOCCER

6 April R18-3 V R25-2. The first of four goals scored in the first half was scored by J Machin, R25, with a fine header, then R18 replied with 3 goals, two coming from J Bizzell and one from C Lewis. The second half produced one goal, the scorer being R Pateman, bringing the final score to R18 - 3, R25 - 2. R18 lacked their usual drive but its early days yet. R25 an improved side.
7 April Atlas-1 V Transport-6. This was a game played in windy conditions but this did not deter either side. Transport had an early lead with a goal scored by D Stock followed by one from E Smith. Atlas defence wavered to give D Stock goal No 3. The fourth goal, a penalty, was safely netted by Pete Bourton. The second half showed Atlas still in an attacking mood but they conceded 2 more goals, one from P Bourton and one from E Smith. Atlas found that elusive net in the dying minutes with a fine goal from E Rawson.
11 April R9 V Stores. This was a game that most spectators came away thinking that Stores were unlucky not to have at least drawn, but twice in the first half Stores could have gone ahead but squandered their opportunities. In the second half with the score still 3-2 R9's goal was put under pressure and at times it was only M Smith who saved the day for R9 and who, unfortunately, had to go off injured 5 minutes before time. Dave Davies has certainly strengthened the Stores attack.

Final Score R9 - 3	Stores - 2
(Bob Rouse 2)	(M Goddard 1)
(J Crawford 1)	(T Craigo 1)

Rutherford Football League Table - date 11 April 1972

TEAMS	P	W	D	L	F	A	Pts
Trans	2	2	0	0	11	3	4
R 9	2	1	1	0	6	5	3
R 18	1	1	0	0	3	2	2
Atlas	2	0	1	1	4	9	1
D O	1	0	1	0	2	2	1
Stores	2	0	1	1	4	5	1
R 25	1	0	0	1	2	3	0
Hall 3	1	0	0	1	2	5	0

DANCE NOTICE

Cheese and Wine Dance held on 24 March 1972 - Val Goodwin and Wendy Darce wish to thank all the staff and friends at the Laboratory who helped to organize the dance and do the cleaning up. The amount raised on the raffles was £43.25 (a cheque for this amount has been sent to the Oxford Animal Sanctury Association). Of this amount £4.12 was donated from cloakroom takings by Mr & Mrs Jack Townsend.
List of winners of the Grand Draw:-
1st Prize P Drake, Basingstoke - Bottle of whisky (not claimed)*
2nd Prize Mrs J Hay, 23 Tavistock Avenue Didcot - Easter egg
3rd Prize Mrs B Hands, Building R25 - Bottle of Wine
4th Prize Mr F Cook, Weld Department - Box of Chocolates
5th Prize Mr Gordan Scott - 1 Dozen Eggs
6th Prize Mr Sidney Maskell - Cigarettes
* If anyone remembers selling a ticket to Mr Drake would they please contact Mrs W Dance Ext 418.
Winner of the Small Draw - Mrs Douglas won both prizes: a toy clown, and bathsalts in crocheted poodle cover (items donated by Miss A Foster and Miss E Summerville).
We will donate further sums of money to other Sanctuaries in the area when the outstanding accounts have been settled. A note will appear in the Bulletin giving details.

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