ATF SNEAP December 2016 Sydney

David Weisser's contribution to Accelerator science and Technology (Man in chains)

Nikolai Lobanov

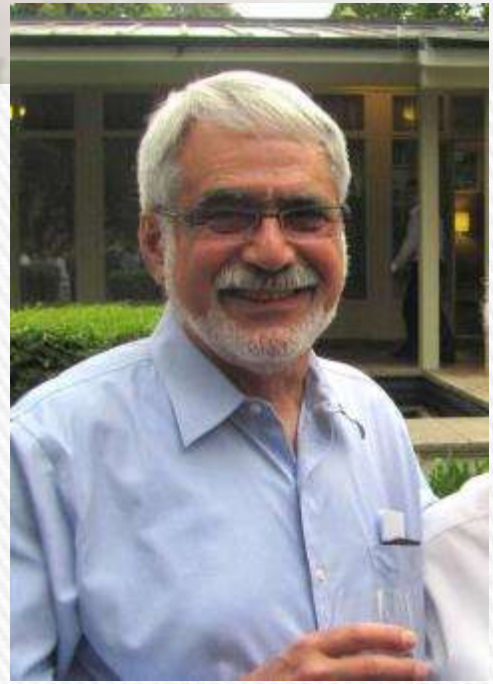
This talk contains part of presentations during
DCW celebration in Nov 2013
Co-contributors: M. Dasgupta, K. Fifield, A. Cooper, G. Dracoulis

Accelerator Research and Operations Manager '75-2008
Special projects Manager '08- 2015

JEAN-JACQUES ROUSSEAU

1712–1778

L'homme est né libre, et partout il est dans les fers.
Man is born free, and everywhere he is in chains.
Du Contrat Social, ch. 1



Wise man and elephant

DCW – Nuclear Physicist

Nuclear Physics A385 (1982) 505–515
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THE MASS OF ^{18}C FROM A HEAVY ION DOUBLE-CHARGE-EXCHANGE REACTION

L. K. FIFIELD, J. L. DURELL †, M. A. C. HOTCHKIS, J. R. LEIGH, T. R. OPHEL and

Department of Nuclear Physics, Research School of Physical Sciences, Australian National University, PO Box 4, ACT 2600, Australia

Received 12 February 1982

Reaction: $^{48}Ca(^{18}O,^{18}C)^{48}Ti$, E_{beam} = 112 MeV, 300 nA

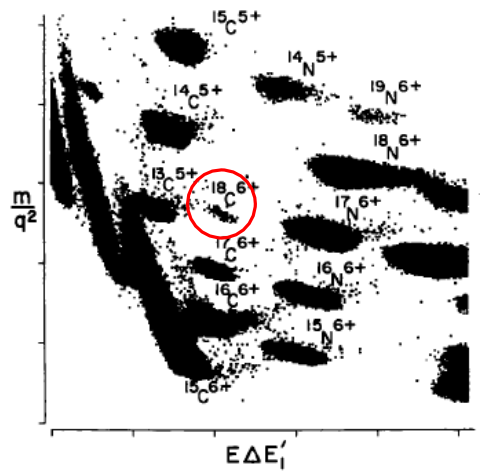


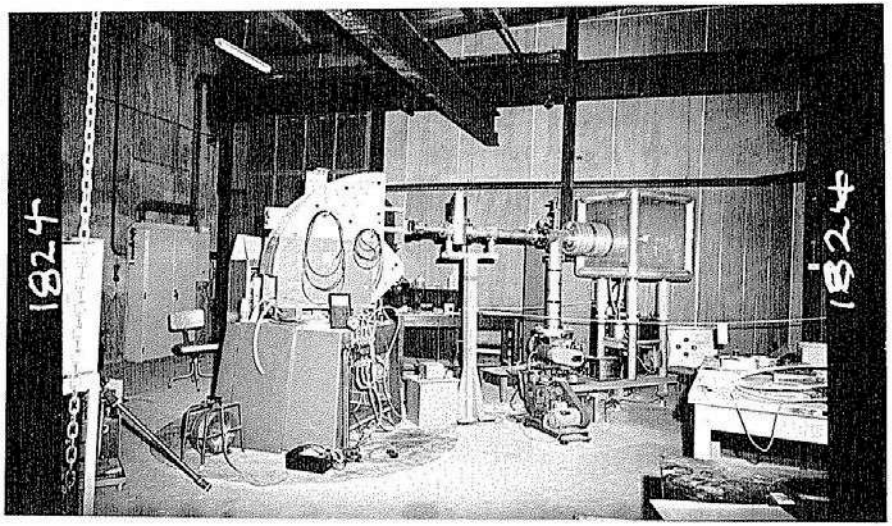
Fig. 1. Two-dimensional particle identification plot for ~ 20 % of the $^{18}O+^{48}Ca$ data. The notation employed for the axis labels is defined in the text, and the threshold level is 2 counts per channel. The elongated groups correspond to particle types which do not stop within the detector gas.

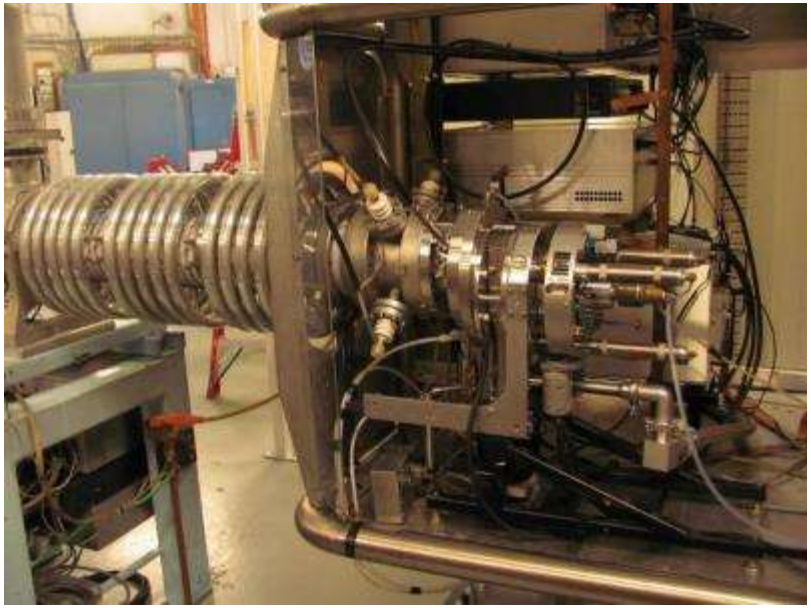
David Weisser and AMS

Departmental Photo - 21 November 1983

David appointment HERALDED AN ERA OF VIGOROUS INVESTIGATION AND MODIFICATION OF THE 14 UD, AND IN FACT MOST ANCILLIARY SYSTEMS, THE BENEFITS OF WHICH WILL GO ON INTO THE FUTURE.

New Injection System - 1989





Dark Days...

1982

Multi M$ labs design and development

- John Carver Building (Linac) 91
- NP Office block 99
- AMS labs 01
- Teaching and Detector labs 09

Management

- Procurement of Linac
- Insurance claim for Linac shipping damage
- Manage technical staff (~15)
- Direct academic staff (~10)
- Research heavy ion facility serving local and overseas users
- EME accelerators and instrumentation as per MOU of 03/2006 till 03/2011
- Development policies of School Facilities

TARGET RICH ENVIRONMENT

A PROBLEM SORTER'S DREAM (MAYBE NIGHTMARE)

- CHARGING CHAIN BREAKAGES
- SF6 BREAKDOWN PRODUCTS
- GAS HANDLING SYSTEM
- SHORTING ROD HANDLING
- SAFETY SYSTEMS
- CORONA POINTS TO RESISTORS
- ION SOURCES
- LINAC INSTALLATION
- RADIATION CONTROL

HUGE POSITIVE IMPACT

DAVID'S SCIENTIFIC METHODS, IMAGINATION AND DEDICATION PLAYED A LARGE PART
IN PLACING OUR LAB HIGH IN
WORLD NP STANDINGS.

TOP NOTCH OPERATION IS HELD IN
HIGH ESTEEM OVERSEAS AND AT HOME

Be prepared to fight the same battle...

A Subnanosecond Beam Pulser for the 14UD Accelerator
ANU New Initiatives and Major Equipment 1981.
SHEBA - Superconducting Heavy Ion Booster Accelerator
Commonwealth Tertiary Education Commission 1984.
National Accelerator Facility for Basic and Applied Research
Submission to the Australian Government 1987.
ANU-EPSRC Agreement; LINAC Transfer
Pleas to the ANU 1991-1992
LINAC Control System
.Submission to University Computing Committee, 1992
High Pressure Gas Stripper for the 14UD Accelerator
Submission to ANU Major Equipment Committee, 1994.
Heavy Ion Facility
ANU Strategic Development, 1994
Towards Heavier Ions for Nuclear Dynamics and Nuclear Structure
ANU Strategic Development, 1995
Superconducting Time-Energy Lens for the ANU Linac
Submission to ANU Major Equipment, 1995
National Heavy Ion Accelerator Facility
Major National Research Facilities Program, 2001
National Heavy Ion Accelerator
Australian Research Council; Linkage Infrastructure 2004
ANU Major Equipment Committee Matching Grant
National Heavy Ion Accelerator Facility
NCRIS 2007-2009

LINAC shipping suit 1993? DCW in court
Building Refurbishment 1999-2000

Bids

Accelerator technology

- Negative ion sour sources
- Gas Stripper
- High voltage electrostatics and dynamics
  16.6 MV development
  - invention ANU resistors
  - Surge protection
- $16M Linac installation, commissioning and upgrades
  - 2007 ACT Engineering Excellence Award and ACT Government New Technology and innovation Award
  - 2007 Australian Engineering Excellence Award
- Novel srf structures
- Srf films: lead and niobium
- Cryoplant and cryostats
- Radiation protection and co-invention of Cooperite

Gas Stripper

22/6/94

1

A SUBMISSION FOR MAJOR EQUIPMENT EXPENDITURE

A High-Pressure Gas Stripper for the 14UD Accelerator

The Department of Nuclear Physics
RSPhysSE, Australian National University

June 1994

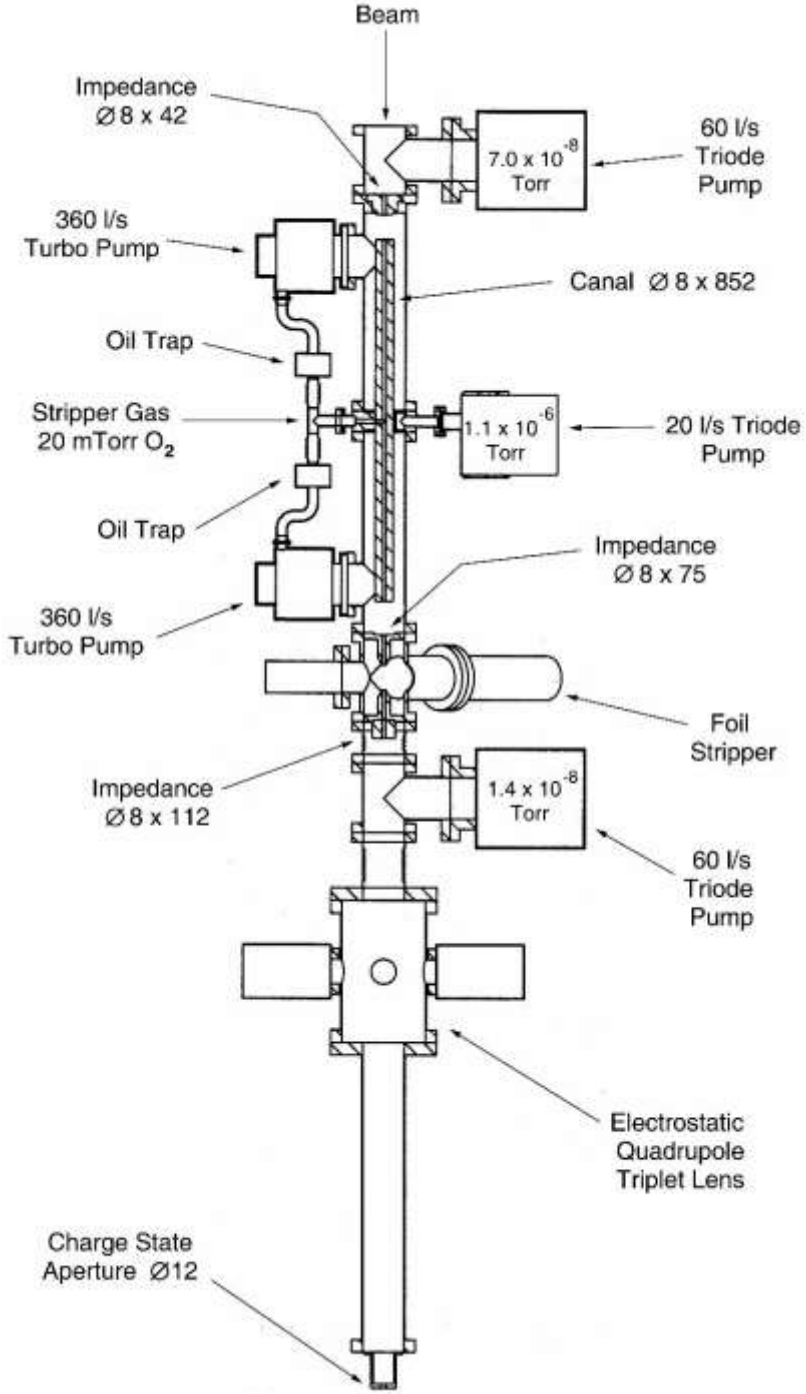
SUMMARY Point-by-Point Summary

MAIN PROPOSAL

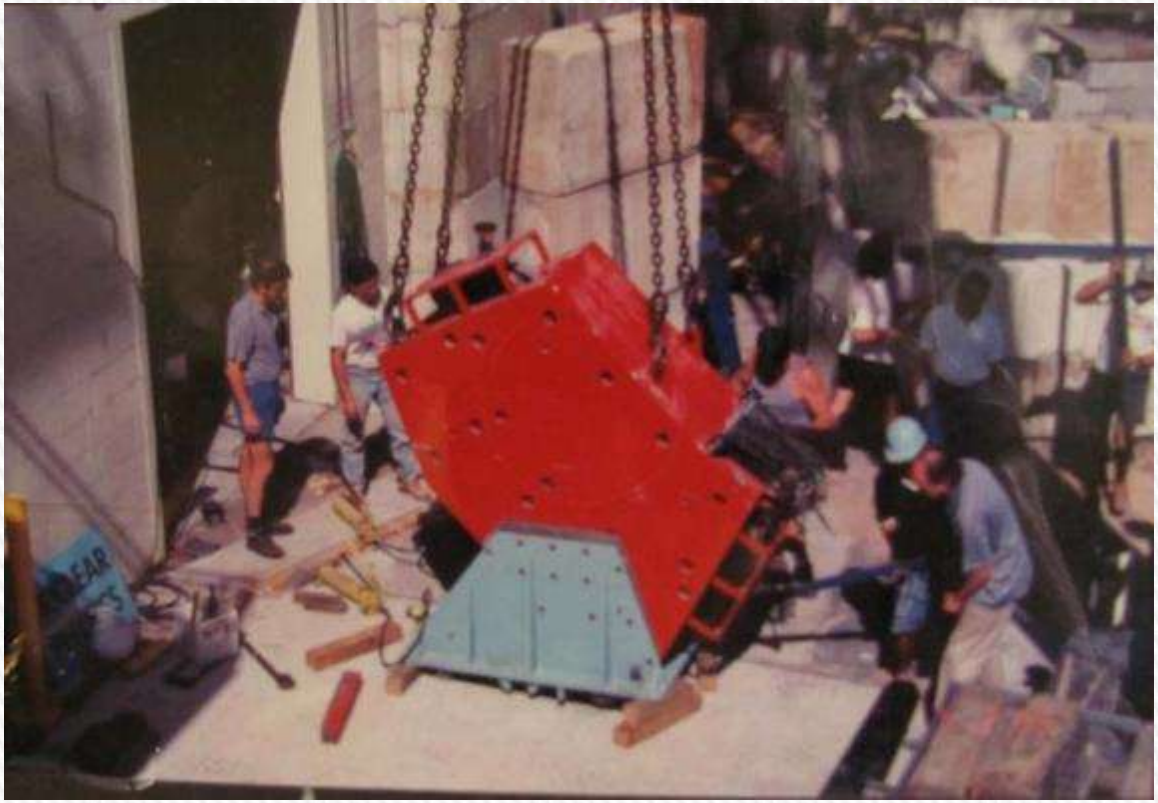
Contents

duction
2. The Importance of a Gas Stripper to the Research Program
3. Technical Considerations
4. Usage and Personnel
5. Costing
6. Quotations

Prepared by: L.K.Fifield, D.C.Weisser and G.D. Dracoulis


Beam
Impedance
Ø 8 x 42
7.0 x 10^-8
Torr
60 l/s
Triode
Pump
360 l/s
Turbo Pump
Canal Ø 8 x 852
Oil Trap
Stripper Gas
20 mTorr O2
1.1 x 10^-6
Torr
20 l/s Triode
Pump
Oil Trap
Impedance
Ø 8 x 75
360 l/s
Turbo Pump
Foil
Stripper
Impedance
Ø 8 x 112
1.4 x 10^-8
Torr
60 l/s
Triode
Pump
Electrostatic
Quadrupole
Triplet Lens
Charge State
Aperture Ø12

New coils for analysing magnet - 1996

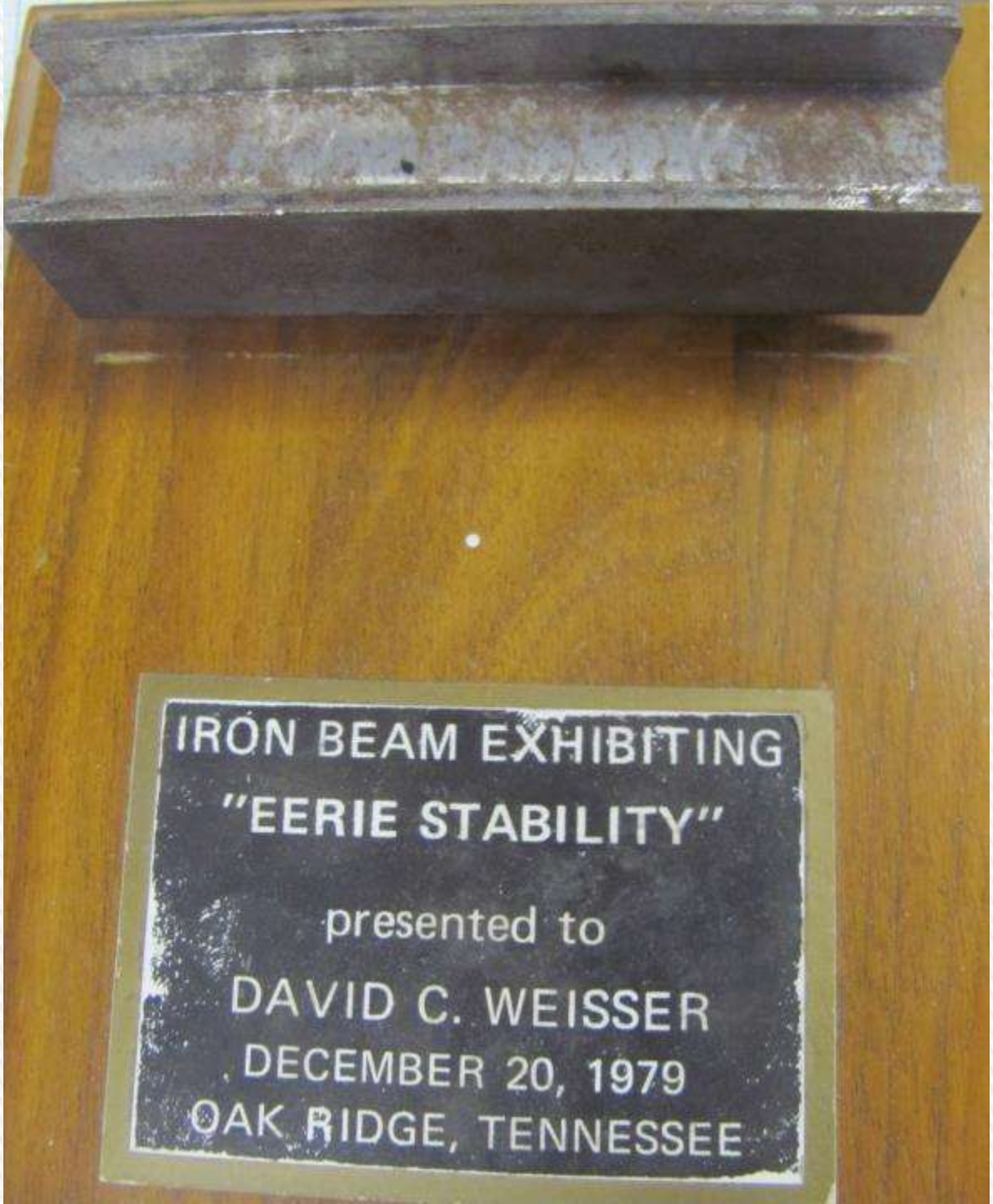


40% of coils shorted out – max'm field 1.0 T

£80k from UK Department of Health for new coils to improve plutonium capability.

Now goes to 1.7 T

International impact


IRON BEAM EXHIBITING
"EERIE STABILITY"
presented to
DAVID C. WEISSER
DECEMBER 20, 1979
OAK RIDGE, TENNESSEE

World record 14UD Voltage

RESISTOR IMPROVEMENTS FOR A NEC PELLETRON

DR D.C. WEISSER

Department of Nuclear Physics, Research School of Physical Sciences, Australian National University, Canberra, ACT 2601, Australia

At SNEAP 89, ANU[1] reported the design, installation and early improvements in resistor assemblies for the 14UD Pelletron Accelerator. The 3000 resistor assemblies have now successfully logged 6644 hours of operation at terminal voltages up to 16.6 MV and have experienced many terminal sparks. There have been no resistor failures other than infintile ones associated with 0.1% manufacturing flaws. These have been rectified under warranty by Welwyn.

SYMPOSIUM OF
NORTH EASTERN
ACCELERATOR PERSONNEL

James R. Macdonald Laboratory
Kansas State University
October 22 – 25, 1990

J.R. MACDONALD LABORATORY
S.N.E.A.P. '90
KANSAS STATE UNIVERSITY

Tank Opening Reports

14UD TANK OPENING - FEBRUARY 2nd, 1976 - No.1.

The main reason for going in the tank was to find out why Chain 2 had been behaving irregularly: charging current had been fluctuating, and disturbance was both heard on the audio (bang) amplifier and seen on the NMR. The effect did not always occur, but would start up eventually if Chain 2 was left running; in the end the chain was left off and the machine ran on Chains 1 and 3 very satisfactorily at a conditioned voltage of 13.6 MV.

Dr. Ophel
Dr. Weisser
Dr. Rathmell, N.E.C.
Chiaki Kobayashi, Japan Atomic Energy Res. Inst.
Dr. J. Ball, Oak Ridge.
Dr. Katori, Tokyo University.

T.A. Brinkley
16th February, 1976.

AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF NUCLEAR PHYSICS
14UD TANK OPENING REPORT No. 51

Two Openings.

25th November to 6th. December 1985
(11 days open; 9 working days)

Re-entry
10th December 1985
1 day open.

REFERENCES: Earlier Tank Opening Reports are referred to by the notation (38/4) etc, meaning Report No. 38, page 4.

We send our best wishes for Christmas and a happy and successful New Year to all of you in the laboratories which receive these reports.

D. C. Weisser.

T. A. Brinkley

16th December 1985.

14 UD Tank Opening Report

#119

13 February – 1 March 2013

Team leader	A. Muirhead
Report compiled by	P. Linardakis, A. Muirhead, J. Heighway
Tank crew	A. Cooper, G. Crook, J. Heighway, P. Linardakis, N. Lobanov, A. Muirhead, T. Tunningley, C. Gudu, D. Weisser
Gas handling	J. Bockwinkel, J. Heighway, L. Lariosa
Electronics Unit	N/A

ENGAGING STAFF

DAVID PLANNED AND MANAGED MANY UPGRADES IN THE LAB. THESE REQUIRED SOLUTIONS TO MANY PROBLEMS AND INVOLVED

ALL THE TECHNICAL STAFF.

DAVID'S DRIVE AND THOROUGHNESS ALWAYS ENSURED COMPLETE SUCCESS.

LINAC: PEOPLE ENTERPRISE

SUPERCONDUCTING LINAC BOOSTER AT THE ANU COMMENCING PHYSICS OPERATIONS

D. C. WEISSER
Nuclear Physics Department
Research School of Physical Sciences and Engineering
the Australian National University
Canberra, A. C. T. 0200
AUSTRALIA

Abstract

A superconducting linear accelerator has been commissioned to enhance the capabilities of the 14UD Pelletron at the ANU. A description of the machine at present and its future scope will be presented. Technical progress in LINAC and other areas of accelerator technology will also be discussed.

SYMPOSIUM OF NORTH-EASTERN ACCELERATOR PERSONNEL

Woods Hole Oceanographic Institution
Woods Hole, USA
October 27 – 30, 1996

5.1 The Great October Revolution - 33 & 34 October, 1994

The first substantial performance goal after the re-commissioning of the Helium refrigerator, was to transport beam from the 14UD around the LINAC loop without any LINAC acceleration. This would test almost all of the beam optics, computer control, beam diagnostics and radiation interlocks. A target date of the end of October, 1994 was set to revolve the beam around the loop, thus the Great October Revolution. In 1994, it was necessary for October to have 33 days in order for us to achieve this important and ambitious goal. All systems worked well enough to get the result and to point to clear paths for future improvements. Most importantly, it confirmed the validity of the beam optics calculations upon which the whole project rested.

Whose Counting?

1996 (at the LINAC launch)
"This occasionally reluctant
team, many of whom had
other pressing demands on their time including worrying about
their own research careers, has been led by someone
with an enthusiasm, patience and forbearance
that goes way beyond anything that I can ever muster:

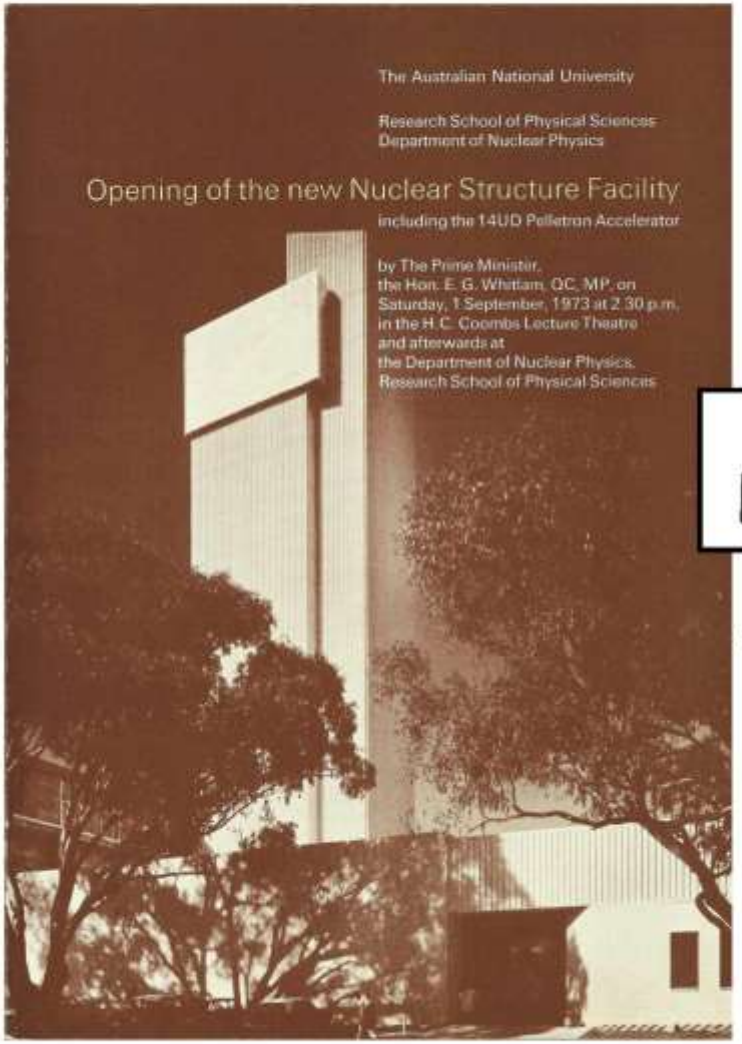
- David Weisser"

That hasn't changed!

Contributions? Too many to count, surely

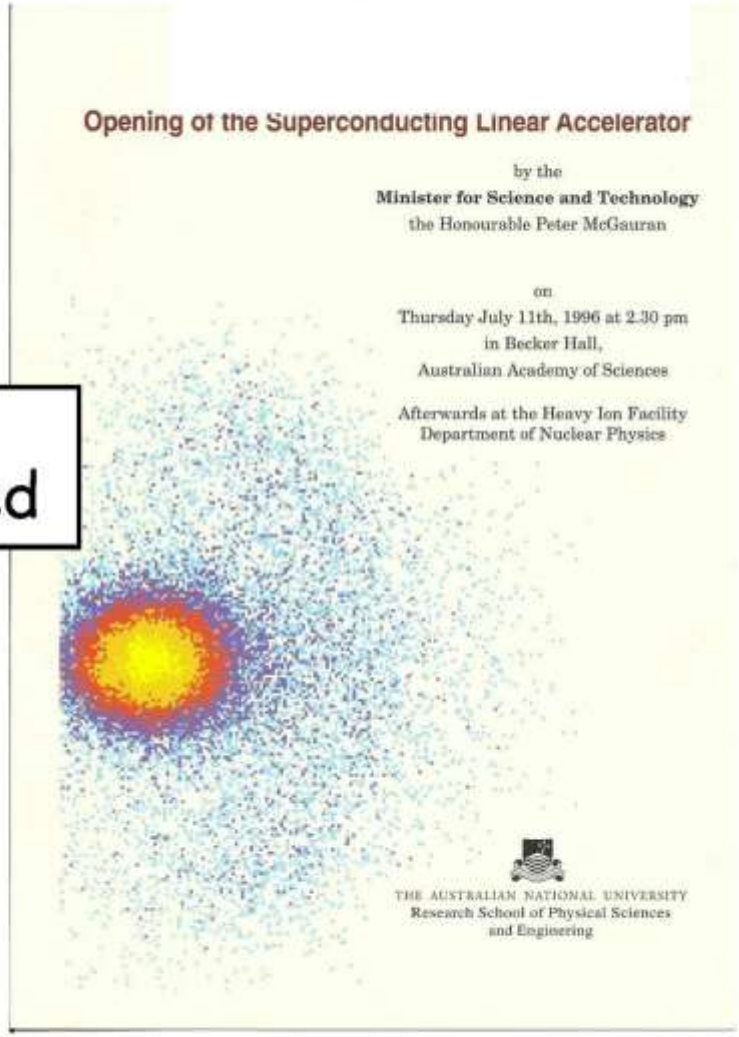
Milestones...

1975



Lots Happened

1996



Opening of the Superconducting Linear Accelerator

by the
Minister for Science and Technology
the Honourable Peter McGauran

on
Thursday July 11th, 1996 at 2.30 pm
in Becker Hall,
Australian Academy of Sciences

Afterwards at the Heavy Ion Facility
Department of Nuclear Physics

THE AUSTRALIAN NATIONAL UNIVERSITY
Research School of Physical Sciences
and Engineering

Openings