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Addendum

UNIVERSITY OF CALIFORNIA
Ernest O. Lawrence
Radiation Laboratory

LIST OF PARTICLE-ACCELERATOR INSTALLATIONS: ADDENDA AND ERRATA

DISCLAIMER

UCRL-8050-Addendum
Particle Accelerator and
High-Voltage Machines

UNIVERSITY OF CALIFORNIA

Lawrence Radiation Laboratory
Berkeley, California

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January 20, 1959

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Communications received by the author after recent publication of a list of particle-accelerator installations operating throughout the world have yielded additional information and pointed out certain errata.[1] The addenda and corrected information are given below.

Addenda

1. DIRECT CURRENT MACHINES

In the United States

Location	Type	Dimensions	Particles accelerated	Energy (Mev)
[2]Argonne National Laboratory Lemont, Ill.	Van de Graaff	n.a.	e, p, d	3.0

[1] Gerald A. Behman, Nuclear Instr. 3, 181 (1958).

[2] J.R. Wallace, Argonne National Laboratory, private communication, December, 1958.

[3]General Electric Co., General Engineering Laboratory, Schenectady, N. Y.	Cockcroft-Walton	3.6-ft accelerating tube	d	0.4
	*Cockcroft-Walton	15-ft accelerating tube	e	1
	*Cockcroft-Walton	15-ft accelerating tube	d	1
[4]Vanderbilt University, Nashville, Tenn.	Cockcroft-Walton	n.a.	p, d, α	0.4
[5]Wesleyan University, Middletown, Conn.	Cockcroft-Walton	3-ft accelerating tube	d	0.16

*Under construction

[3]R. S. Rochlin, General Engineering Laboratory, General Electric Co., private communication, February, 1959.

[4]C. D. Curtis, Vanderbilt University, private communication, February, 1959.

[5]F. Boley, Wesleyan University, private communication, January, 1959.

Outside the United States

Location	Type	Dimensions	Particles accelerated	Energy (Mev)
Chile				
[6]Laboratoria de Fisica Nuclear, Santiago	Cockcroft-Walton	12-ft accelerating tube	p, d, α	0.72
France				
[7]Centre d'Etudes Nucléaires de Saclay, Saclay	Felici	0.41-m accelerating tube	p, d	0.15
	Felici	1.9-m accelerating tube	p, d	0.6
	Cockcroft-Walton	n.a.	p, d	0.3
[7]Compagnie Francaise de Raffinage	Van de Graaff	n.a.	e	2
[7]Direction des Etudes et Fabrications d'Armement, Paris	Felici	0.41-m accelerating tube	p, d	0.15
[7]Ecole des Hautes Etudes, Paris	Felici	n.a.	p, d	0.3
[7]Faculte des Sciences, Alger	Felici	1.9-m accelerating tube	p, d, e	0.6
[7]Faculte des Sciences, Grenoble	Felici	n.a.	p, d	0.3
	Felici	n.a.	e	1
[7]Faculte des Sciences, Paris	Felici	1.9-m accelerating tube	p, d, e	0.6
	Cockcroft-Walton	n.a.	e	1

[6]C. M. Raggio Laboratoria de Fisica Nuclear, Santiago, Chile, private communication, December, 1958.

[7]P. Silvy, Societe Anonyme de Machines Electrostatique, Grenoble, France, private communication, December, 1958.

[7]Faculte des Sciences, Strasbourg	Felici	n.a.	p,d	0.3
	Felici	0.41-accelerating tube	p,d	0.15
[7]Laboratoiree de Synthese Atomique, Ivry	Felici	1.9-m accelerating tube	p,d,e	0.6
	Felici	n.a.	p,d	0.3
New Zealand				
[8]Auckland, University, Auckland	Cockcroft-Walton	n.a.	p,d	0.6
[8]Otago, University, Dunedin	Van de Graaff	n.a.	n.a.	0.7
Pakistan				
[9]Government College, Lahore	Cockcroft-Walton	12-ft accelerating tube	p,d,a	1.2
Turkey				
[10]Istanbul, University, Istanbul	Cockcroft-Walton	2.5-m accelerating tube	p,d	0.8

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[8]R.E. White, High Voltage Laboratory, Massachusetts Institute of Technology, Cambridge, Mass., private communication, January, 1959.

[9]R.M. Chaudri, Government College, Lahore, Pakistan, private communication, March, 1959.

[10]I. Yenicay, Istanbul University, Istanbul, Turkey, private communication, January, 1959.

II. INDUCTION MACHINES: BETATRONS

Outside the United States

Location	Orbit radius	Particles accelerated	Energy (Mev)
Belgium			
[11] Universite-Klinik Prof. van Vaerenbergh, Ghent	10 cm	e	15
France			
[11] Laboratoire Central des Industries Electriques, Paris	10 cm	e	15
Germany			
[11] Czerny-Krankenhaus, Heidelberg	10 cm	e	15
[11] Firma Mannesmann, Duisburg-Huckingen	10 cm	e	15
[11] Med.-Universitätsklinik, Erlangen	10 cm	e	15
[11] St. Georg-Krankenhaus, Hamburg	10 cm	e	15
[11] Städt. Krankenanstalten, Düsseldorf	10 cm	e	15
[11] Strahlenklinik Prof. Janker, Bonn	10 cm	e	15
[11] Universitäts-Frauenklinik, Hamburg	10 cm	e	15
[11] Universitäts-Hautpoliklinik, Göttingen	10 cm	e	15

[11] E. Walter and K. F. Malsch, Siemens-Reiniger-Werke Aktiengesellschaft, Erlangen, Germany, private communication, February, 1959.

[11] Universitäts-Klinik, München	10 cm	e	15
[11] Universitäts-Strahleninstitut, Marburg	10 cm	e	15
[11] Universitäts-Strahleninstitut, Tübingen	10 cm	e	15
Italy			
[11] Centro Tumori, Cagliari	10 cm	e	15
[11] Centro Tumori, Chieti	10 cm	e	15
[11] Centro Tumori, Palermo	10 cm	e	15
[11] Consorzio Cura Tumori, Udine	10 cm	e	15
[11] Instituto die Radiologia dell' Universita, Rome	10 cm	e	15
[11] Instituto Regina Elena, Rome	10 cm	e	15
[11] Ospedale San Lorenzo, Borgo Valsugana	10 cm	e	15
Mexico			
[11] Centro Medico, Mexico City	10 cm	e	15
Sweden			
[11] Radiumhemmet, Stockholm	10 cm	e	15

Corrections

Certain fixed-field alternating-gradient (FFAG) accelerators were included in the synchrotron group in the recently published list by this author.[1] McMillan has pointed out that, under the classification system suggested by him for this list, all FFAG accelerators belong in the cyclotron class because the field does not vary as a function of time.[12] Accordingly, the FFAG machines listed for the Midwestern Universities Research Association, Madison, Wis. should be included in the cyclotron group in this list.

In the classification system used, two general types of cyclotrons were indicated. These are continuous-wave (CW) and frequency-modulated (FM) machines. It should be noted that the FM class of cyclotrons may be referred to alternatively as synchrocyclotrons.

The dimensions of the larger of two Van de Graaff machines at Argonne National Laboratory, Lemont, Illinois were listed incorrectly. This machine has a 15-ft accelerating tube, can accelerate protons, deuterons, or alpha particles, and has a maximum energy of 4.5 Mev.[2]

D.C. machines listed at the Centre d'Etudes Nucléaires, Grenoble, France and at the Laboratoire de Physique Atomique et Moleculaire, College de France, Paris are Felici-type accelerators rather than Van de Graaff generators.[7] As contrasted with the belt system of charge transport of the Van de Graaff machines, the Felici machine uses a dielectric cylinder which rotates about a slightly conducting glass stator. Thin steel strips charge and discharge the rotor as a result of induction of metallic inductors within the glass cylinder. For improved efficiency, the machine usually operates under a high pressure.[13]

The proper location of the betatron listed for the Knolls Atomic Power Laboratory is General Engineering Laboratory, General Electric Company, Schenectady, N.Y.[3]

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[12] Edwin M. McMillan, Lawrence Radiation Laboratory, private communication (1958).

[13] Emile Labin, Electromechanical Design 2, No. 11, 24 (1958).

The 4-Mev Van de Graaff machine and 32-Mev proton linac formerly at University of California in Berkeley have been moved to the University of Southern California at Los Angeles, California.

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