

ENTRY NO. 19

NAME OF MACHINE ALICE - CEVIL DATE 05.07.78
 INSTITUTION INSTITUT DE PHYSIQUE NUCLEAIRE
 ADDRESS B.P. N° 1 91406 ORSAY FRANCE

IN CHARGE LUC C.B. MARTIAL REPORTED by L. MARTIAL

HISTORY AND STATUS

DESIGN, date 1959 MODEL tests 1958 - 59
 ENG. DESIGN, date 1959 - 1962
 CONSTRUCTION, date 1960 - 64
 FIRST BEAM date (or goal) 1965 APRIL
 MAJOR ALTERATIONS LINAC INJECTOR 1968
new beams area 1972
 OPERATION, 120 hr/wk; On Target 100 hr/wk
 X TIME DIST., in house 59 %, outside 49 %
 USERS' SCHEDULING CYCLE 12 weeks
 COST, ACCELERATOR 5.106 F
 COST, FACILITY, total 12.106 F
 FUNDED BY Ministère National de la
Recherche Scientifique

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 0 ENGINEERS 2
 TECHNICIANS 24 CRAFTS 7
 GRAD STUDENTS involved during year _____
 OPERATED BY _____ Res staff or 13 Operators
 BUDGET, op & dev 10⁶ F

FUNDED BY Centre National de la Recherche
Scientifique

RESEARCH STAFF, not included above

USERS, in house 44 outside 52
 GRAD STUDENTS involved during year 5
 RES. BUDGET, in house 0.9 10⁶ F
 FUNDED BY CNRS - IN2P3

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 290 m²
 movable _____ m²
 TARGET STATIONS 9 in 2 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type 120° n = 1/2
 COMPUTER, model IBM 360 - 70
 OTHER FACILITIES PDP 11/05
PDP 11/34

REFERENCES/NOTES

X - Time is assigned by Program Committee.

MAGNET

POLE FACE diameter 200 cm; R extraction 85 cm
 GAP, min 21 cm; Field 18 kG } at 0.75 x 10⁶
 max 47 cm; Field 12,4 kG } ampere turns
 AVERAGE FIELD at R ext 15 kG }
 CURRENT STABILITY 20 parts/10⁶; B_{max}/(B) 1,2
 NUMBER OF SECTORS 3; SPIRAL, max 0 deg
 POLE FACE COIL PAIRS: AVF 0 /sec;
 Harmonic correction _____
 Rad grad _____ /sec or Circ coils _____
 WEIGHT: Fe 260 tons; Coils 20 tons
 CONDUCTOR, Material and type Aluminium
 STORED ENERGY _____ MJ
 COOLING SYSTEM oil and demineralized water
 POWER: Main coils 490 max, kW
 Trimming coils 72 max, kW
 YOKE/POLE AREA 100 %
 SECTOR ANGLE (Sep Sec) 50 deg
 ION ENERGY (Bending limit) E/A = 75 q²/A² MeV
 (Focusing limit) E/A = _____ q/A MeV

ACCELERATION SYSTEM

DEES, number 1 angle 180 deg
 BEAM APERTURE 5 cm; DC BIAS 0 kV
 TUNED by, coarse _____ fine Trim - Cap
 RF 5 to 10.2 mHz, stable ± 7 /10⁶
 Orb F 1.7 to 10.2 mHz; GAIN, max 150 kV/turn
 HARMONICS, RF/Orb F, used 1 - 3
 DEE-Gnd, max 75 kV, min gap _____ cm
 STABILITY, (pk-pk noise)/(pk RF volt) 0.01
 RF PHASE stable to ± _____ deg
 RF POWER input, max 100 kW
 RF PROTECT circuit, speed 1 μsec
 Type Thyratron crowbar
 FREQUENCY MODULATION, rate _____ /sec
 MODULATOR, type _____
 BEAM PULSE, width _____

VACUUM SYSTEM

PUMPS, No., Type, Size 4 diffusion pumps
one 80 cm three 60 cm
 OPERATING PRESSURE LINAC 0.3 CEVIL Torr,
 PUMPDOWN TIME 10 hrs

ION SOURCES/INJECTION SYSTEM

Internal penning and LINAC with
internal stripping in the cyclotron

EXTRACTION SYSTEM

Electrostatic deflector + magnetic
channels

CONTROL SYSTEM

PDP 11/05

ENTRY NO. 19 (cont.)

CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	$^{14}\text{N}^7$		210
	$^{40}\text{Ca}^{15}$		400
	$^{63}\text{Cu}^{20}$		450
	$^{84}\text{Kr}^{25}$		520
CURRENT		(μA)	(μA)
	Internal		
External	$^{14}\text{N}^7$		0.05
	$^{40}\text{Ca}^{15}$		0.15
	$^{84}\text{Kr}^{25}$		0.015
Secondary		(part/s)	(part/s)

BEAM PROPERTIES

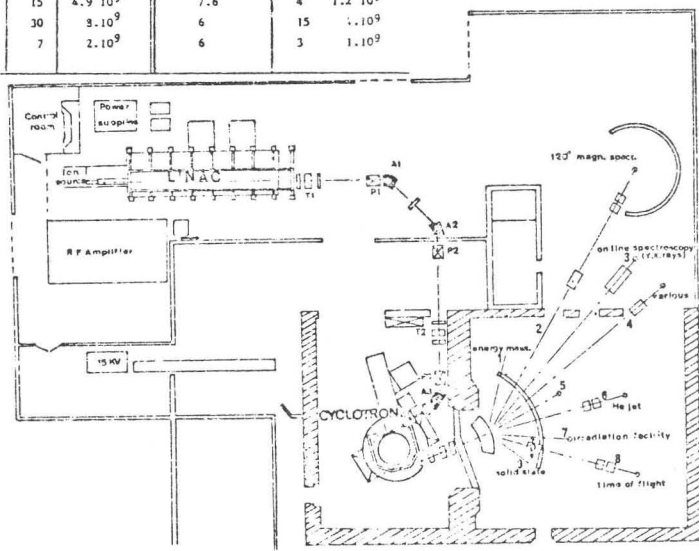
	Measured	Conditions
Pulse Width	11 RF deg	1 μA of 160^5 MeV 106
Phase Exc, max	RF deg	μA of MeV
Extract Eff	40 %	μA of MeV
Res, $\Delta E/E$	1 %	μA of MeV
Emittance	(mm-mrad) { axial } μA of MeV	
	{ radial }	

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	80 %
Solid State Physics + atomic physics	10 %
Bio-Medical Applications	%
Isotope Production	%
Development	10 %

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, OPERATION SUMMARY, ADDITIONAL REFERENCES

Particulate	E min MeV/Uma	Intensit ^e nA PPS		E moy MeV/Uma	Intensit ^e nA PPS		E max MeV/Uma	Intensit ^e nA PPS	
		nA	PPS		nA	PPS		nA	PPS
^{10}B	9	50	8.10^{10}	10	50	10^{10}	14.5	50	3.10^{10}
^{11}B	7			8.5			14.		
^{14}N	9.2	200	2.10^{11}	12	200	2.10^{11}	15	40	3.10^{10}
^{16}O	7	500	$5.2 10^{11}$	10	500	$5.2 10^{11}$	13.5	300	$2.6 10^{11}$
^{19}F	5	250	$2.6 10^{11}$	8.8	500	$4.4 10^{11}$	12.5	200	$1.6 10^{11}$
^{20}Ne	5	100	1.10^{11}	10	800	$6.2 10^{11}$	14.3	150	1.10^{11}
^{22}Ne	5	10	1.10^{10}	8.5	15	1.10^{10}	11.8	15	1.10^{10}
^{24}Mg	5	30	$2.6 10^{10}$	10	100	$6.9 10^{10}$	15	20	1.10^{10}
^{26}Mg	5	15	$1.3 10^{10}$	9	30	2.10^{10}	12.6	15	1.10^{10}
^{27}Al	5	100	8.10^{10}	8.5	300	2.10^{11}	11.7	200	$1.1 10^{11}$
^{32}S	5	500	3.10^{11}	8.5	100	5.10^{11}	11.7	250	$1.2.10^{11}$
^{35}Cl	5	100	6.10^{10}	8	300	$1.5 10^{11}$	11.3	30	$1.3.10^{10}$
^{40}Ar	4	100	$6.2 10^{10}$	6	100	$5.2 10^{11}$	8.6	500	$2.2 10^{11}$
^{40}Ca	4	100	$5.6 10^{10}$	7	400	2.10^{11}	10	150	$6.2 10^{10}$
^{48}Ti	4	20	1.10^{10}	6	60	$2.5 10^{10}$	8.8	20	$7.3 10^9$
^{51}V	3.6	40	2.10^{10}	5.6	80	$3.3 10^{10}$	7.7	40	$1.5 10^{10}$
^{52}Cr	3.6	40	$1.9 10^{10}$	6	100	$3.9 10^{10}$	8.5	40	$1.4 10^{10}$
^{56}Fe	3.6	30	$1.2 10^{10}$	5.8	50	2.10^{10}	8	30	1.10^{10}
^{59}Co	3.6	10	4.10^9	5.5	30	$1.1 10^{10}$	7.3	15	5.10^9
^{58}Ni	3.6	20	1.10^{10}	6	30	1.10^{10}	8.4	20	5.10^9
^{63}Cu	3.6	80	$2.4 10^{10}$	5.3	80	$2.6 10^{10}$	7	50	$1.5 10^{10}$
^{65}Cu	3.6	10	$6.9 10^9$	5.3	15	$5.2 10^9$	7	10	$3.1 10^9$
^{64}Zn	3.6	5	$1.9 10^9$	5.3	30	$9.8 10^9$	7.6	10	$2.9 10^9$
^{66}Zn	3.6	3	$1.1 10^9$	5.3	20	$6.6 10^9$	7.6	5	$1.5 10^9$
^{68}Zn	3.6	2	$7.8 10^8$	5.3	15	$4.9 10^9$	7.6	4	$1.2 10^9$
^{84}Kr	3.6	30	1.10^{10}	4.8	30	9.10^9	6	15	1.10^9
^{86}Kr	3.6	6	2.10^9	4.8	7	2.10^9	6	3	1.10^9



ALICE plan view