

ENTRY No. 20

NAME OF MACHINE CYCLOTRON 520 DATE 1.3.1979
 INSTITUTION CEA/Département de Biologie
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 IN CHARGE D. COMAR REPORTED BY C. CROUZÉL

HISTORY AND STATUS

DESIGN, date 1973 Model tests ..
 ENG DESIGN, date 1973 ..
 CONSTRUCTION, date 1974 ..
 FIRST BEAM, date (or goal) May 1975 ..
 MAJOR ALTERATIONS ..

COST, ACCELERATOR ..
 COST, FACILITY, total ..
 FUNDED BY ..

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS .. ENGINEERS ..
 TECHNICIANS .. CRAFTS ..
 GRAD STUDENTS involved during year ..
 OPERATED BY .. Research staff or .. Operators
 OPERATION .. hr/wk, On target .. hr/wk
 TIME DISTR. in house .. %, Outside .. %
 BUDGET, op & dev .. %

FUNDED BY ..
RESEARCH STAFF, not included above

USERS, in house .. outside ..
 GRAD STUDENTS involved during year ..
 RESEARCH BUDGET, in house ..
 FUNDED BY ..

MAGNET

POLE FACE, diameter (compact) 120 cm, R extraction 52 cm
 R injection .. cm
 GAP, min 8.6 cm, Field 17.1 kG }
 max 14.1 cm, Field 10.6 kG } at 1, 36, 10⁸
 AVERAGE FIELD at R ext .. 14.1 kG } Ampere turns
 B max/ 1.21 ..
 NUMBER OF SECTORS { compact 4 .. } Spiral, max 3.4 deg
 separated .. deg
 SECTOR ANGLE (SSC) .. deg
 TRIMMING COILS .. Harmonic correction: 4 ..

CONDUCTOR, material and type ..
 STORED ENERGY (cryogenic) .. MJ
 POWER: main coils 6.5 max, kW; current stability 2.10⁻⁵
 trimming coils 1.0 max, kW; current stability ..
 WEIGHT: Fe 28 tons; coils .. tons
 COOLING system .. water ..
 ION ENERGY (bending limit) E/A = .. q²/a² MeV/amu
 (focusing limit) E/A = .. q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2; angle 50 deg
 BEAM APERTURE 2 cm; DC Bias 1 kV
 TUNED by, coarse .. yes .. fine .. yes ..
 RF 20 to 62 MHz, stable $\pm 10^{-6}$..
 Orb F 6 to 20 MHz
 HARMONICS, RF/Orb F, used 2, 3, 6 ..
 DEE - Gnd, max 35 kV, min gap 2 cm
 STABILITY, (pk-pk noise)/(pk RF volt) 0.001 ..
 ENERGY GAIN, max 100 kV/turn
 RF PHASE, stable to \pm 0.1 deg
 RF POWER input, max 20 kW
 FREQUENCY MODULATION, rate .. /s
 modulator, type ..
 beam pulse, width ..

VACUUM SYSTEM

OPERATING PRESSURE .. Torr or mbar
 PUMPS, No, Type, Size ..
 Diffusion pump ..

ION SOURCES

Livingston ..

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic deflector ..

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed .. m²; movable .. m²
 TARGET STATIONS .. 3. in .. 2. rooms
 STATIONS served at same time, max 1 ..
 MAG SPECTROGRAPH, type ..
 COMPUTER model ..
 OTHER FACILITIES .. Isotope production ..

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μA)	
	Goal	Achieved	Internal	External
p	24		200	70
d	13		400	70
α	26		100	50
³ He	33		100	50
SECONDARY				(part/s)

BEAM PROPERTIES

MEASURED .. CONDITIONS ..
 PULSE WIDTH .. RF deg .. μA of .. MeV .. ions
 PHASE EXC, max .. RF deg .. μA of .. MeV .. ions
 EXTRACT eff .. % .. μA of .. MeV .. ions
 RESOL ΔE/E .. % .. μA of .. MeV .. ions
 EMITTANCE ..
 (π mm. mrad) { .. axial } .. μA of .. MeV .. ions
 { .. rad }

OPERATING PROGRAMS, time distribution
 BASIC NUCLEAR PHYSICS .. SOLID STATES PHYSICS ..
 BIOMEDICAL APPLICAT. + .. ISOTOPE PRODUCTIONS 100%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

