

**ENTRY NO. 101**

NAME OF MACHINE **Medi-Physics MC-40 Cyclotron 1**  
 INSTITUTION **Medi-Physics Inc.**  
 ADDRESS **3350 N. Ridge Ave., Arlington Heights, Ill. 60004 U.S.A.**  
 TEL **(312) 398-8400** TELEX **230-25-4439**  
 IN CHARGE **R. Hubbard** REPORTED BY **E. A. Kowalski**

**HISTORY AND STATUS Scanditronix MC40**

DESIGN, date **Model tests**  
 ENG DESIGN, date  
 CONSTRUCTION, date  
 FIRST BEAM, date (or goal) **Feb. 1979**  
 MAJOR ALTERATIONS

COST, ACCELERATOR  
 COST, FACILITY, total  
 FUNDED BY

**ACCELERATOR STAFF, OPERATION AND DEVELOPMENT**

SCIENTISTS **4** ENGINEERS  
 TECHNICIANS **11** CRAFTS **2**

GRAD STUDENTS involved during year  
 OPERATED BY **Research staff or Operators**  
 OPERATION **140** hr/wk. On target **120** hr/wk  
 TIME-DISTR, in house **100** %, 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) **130** cm, R-extraction **50** cm  
 R injection cm  
 GAP, min **10** cm, Field **21.3** kG  
 max **18** cm, Field **13.2** kG at **241,000**  
 AVERAGE FIELD at R ext **17.9** kG Ampere turns  
 B max / <B> **1.19**

NUMBER OF SECTORS {compact **3** } Spiral, max **45** deg  
 {separated }

SECTOR ANGLE (SSC) deg  
 TRIMMING COILS **8 Concentric Gradient Coils**  
**4 Set of Harmonic Coils**

CONDUCTOR, material and type **Cu. Sq. Tube**  
 STORED ENERGY (cryogenic) MJ  
 POWER: main coils **130** max kW: current stability **10<sup>-5</sup>**  
 trimming coils **10** max kW: current stability **10<sup>-4</sup>**

WEIGHT: Fe **57** tons: coils **2.8** tons  
 COOLING system **P. I. Water**

ION ENERGY (Bending limit) E/A = **40** q<sup>2</sup>/A<sup>2</sup> MeV/amu  
 (Focusing limit) E/A = q/A MeV/amu

**ACCELERATION SYSTEM**

DEES, number **2** angle **90** deg  
 BEAM APERTURE **2** cm; DC Bias **0** kV  
 TUNED by, coarse **Mov. Short** fine **Variable Cap.**  
 RF **12** to **27** MHz, stable ± **10<sup>-5</sup>**  
 Orb F **6** to **26.8** MHz  
 HARMONICS, RF/Orb F, used **1&2**  
 DEE-Gnd, max **44** kV, min gap cm  
 STABILITY, (pk-pk noise)/(pk RF volt) **<10<sup>-3</sup>**  
 ENERGY GAIN, max **176** kV/turn  
 RF PHASE, stable to ± **0.5** deg  
 RF POWER input, max **60** kW  
 FREQUENCY MODULATION, rate /s  
 modulator, type  
 beam pulse, width **15-20** Deg.

**VACUUM SYSTEM**

OPERATING PRESSURE **9x10<sup>-6</sup>** Torr or mbar  
 PUMPS, No, Type, Size **2 Oil Diffusion Ø. 400 with**  
**Refrigerated Baffles**

**ION SOURCES**

**Internal Cold Cathode, Axially Mounted**

**INJECTION SYSTEM**

**EXTRACTION SYSTEM**

**Electrostatic Deflector, Magn. Focus Channel**

**FACILITIES FOR RESEARCH**

SHIELDED AREA, fixed m<sup>2</sup>; movable m<sup>2</sup>  
 TARGET STATIONS in rooms  
 STATIONS served at same time, max  
 MAG SPECTROGRAPH, type  
 COMPUTER model  
 OTHER FACILITIES

**CHARACTERISTIC BEAMS**

PARTICLE	ENERGY (MeV)		CURRENT (µA)	
	Goal	Achieved	Internal	External
P		<b>38</b>	<b>200</b>	<b>65</b>
P		<b>20</b>	<b>200</b>	<b>65</b>
D		<b>9.18</b>		<b>65</b>
H-4		<b>36</b>		<b>30</b> µA
SECONDARY				(part/s)

**BEAM PROPERTIES**

MEASURED CONDITIONS  
 PULSE WIDTH **13** RF deg µA of MeV ions  
 PHASE EXC. max RF deg µA of MeV ions  
 EXTRACT eff. **80** % **65** µA µA of **38** MeV P ions  
 RESOL ΔE/E % µA of MeV ions  
 EMITTANCE  
 axial  
 (π mm-mrad) rad µA of MeV

**OPERATING PROGRAMS, time distribution**

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS  
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

**REFERENCES/NOTES**

- 1)
- 2)

**PLAN VIEW OF FACILITY, COMMENTS, ETC.**

Conventional Analog Control.