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PERFORMANCE OF 12UD PELLETRON TANDEM ACCELERATOR

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Résumé. — Les performances de l'accélérateur 12UD de l'université Tsukuba sont décrites.

Abstract. The performance of the 12UD accelerator in Tsukuba are described.

The 12UD accelerator is now in use for researches in nuclear physics, atomic physics, biology, and medical science.

Regular machine time started on november 10, 1976. Total hours for chain running and beam running up to february 8, 1977 are 1 700 and 560 h, respectively. In this period the accelerator ran at terminal voltages between 3.5 and 11.5 MV and behaved excellently without tank opening.

Ion species for routine use are; p (1 μ A), d (1 μ A), ^4He (0.1 μ A), $^{16}\text{O}^{6+}$ (0.1 μ A), and $^{35}\text{Cl}^{8+}$ (0.1 μ A).

For helium negative ion production, the Cs-cell of the Lambshift polarized ion source was utilized as an electron adder.

Sulphur acceleration was tried. The current (analyzed charge current of 0.02 μ A for S (8+)) was limited by deterioration of vacuum in the low energy tube. An additional pumping and trapping station will be necessary for using chemically active source gases.

Performance of NEC's electron trap was tested for chlorine run. The trap seemed inefficient to remove electrons stripped from heavy ions. Rather, when the trap was turned on, X-ray yield from the terminal

area increased slightly. Increase by 40 % of the magnetic field in the trap is scheduled.

Table I shows an example of data for routine operation.

TABLE I

	$^{35}\text{Cl}^{8+}$	$^{16}\text{O}^{6+}$	P
	—	—	—
Preaccel. volt. (kV)	120	126	130
Terminal volt. (MV)	11.35	10.45	7.24
Stripper* lifetime (h)	2	6	very long
Vacuum**; Low energy tube	4.0	3.8	3.0
High energy tube	2.0	1.0	2.2
($\times 10^{-8}$ torr)			
Charging current (μ A)	114	90	107
Lost current (μ A)	20	7	1.5
Accel. transmission (%)	26	63	76
***			****
Analyzed ion current (μ A)	0.11	0.7	1.3

(*) Carbon foil, 10 $\mu\text{g}/\text{cm}^2$.

(**) Vac. without beam : LE., 2; HE., 5 ($\times 10^{-9}$ torr).

(***) Charge current.

(****) Current for $\Delta E_p = 2.8 \text{ keV}$