

LINAC PROJECT AT
NUCLEAR ENGINEERING RESEARCH LABORATORY,
UNIVERSITY OF TOKYO

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An electron linear accelerator facility has been constructed during last 3 years starting the fiscal year of 1974. The machine components had been fabricated and the machine was installed by Mitsubishi Electric Co. The machine has been working since the beginning of the 1977 fiscal year.

The main purposes of our LINAC project at Nuclear Engineering Research Laboratory are following.

The first one is to combine the LINAC with a fast neutron source reactor called "YAYOI" which has been operated since May, 1972, and to get intense fast neutron pulses. This combined system is used for studies on reactor physics and engineering including the design and safety as particular subjects through the pulsing operation of the nuclear reactor.

The second one is to get very narrow and intense electron pulses for studies on transient phenomena including pico-second pulse radiolysis.

Details of research projects are following. Some of the projects have already started and others are now being prepared.

1. Pulse operation of the nuclear reactor
2. Time of flight experiments of pulsed neutron
3. Nano- and pico-second pulse radiolysis
4. Fission neutron pulse radiolysis
5. Time resolved electron spin resonance experiment
6. Thermal shock experiments of heavy metal targets
7. Positron annihilation experiments by slow positrons from electron bombarded targets
8. Study on the measurement of short electron pulses

The layout of our facility is shown in Fig. 1.

— Fig. 1 —

The machine has been operating since the beginning of April, 1977. The pico-second operation has started from the middle of June, 1977. The width of pico-second pulse has been confirmed less than 18 ps by using a streak camera.

There now exist 4 machines in the world which can provide controlled pico-second pulses including a single shot operation of pico-second pulse.

They are listed in Table 1.

Table 1. Accelerators for Pico-second Experiments

	Energy (MeV)	Pulse (Ps)		
Argonne	22	35 (250A)	L-band	<u>Nuclear Physics,</u> <u>Pulse Radiolysis</u>
S. Barbara EGBG	30	50	L-band	Radiation Physics
SLAC	22,800	Picosecond Pulses	S-band	Particle Physics
Tokyo, NERL	35	18 (~100A)	S-band	<u>Pulse Radiolysis,</u> <u>Neutron Physics</u>

Train Pulses ; Toronto, Hahn Meitner, Notre Dame

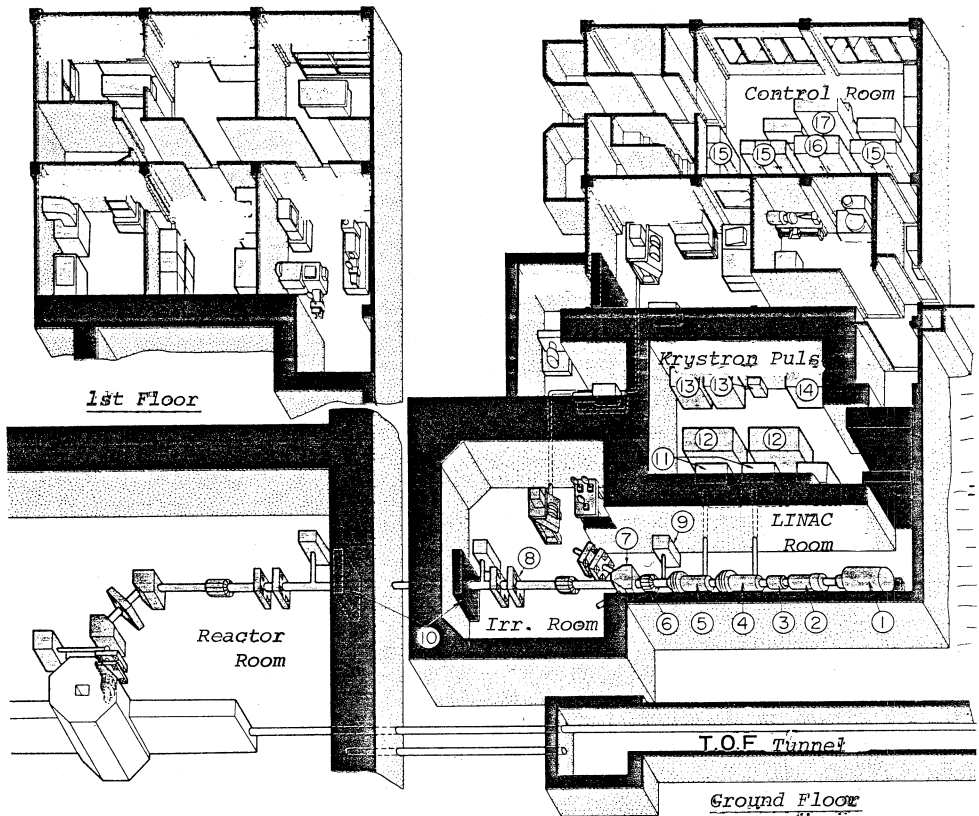


Figure 1 LINAC Facility at NERL, Tokai

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|------------------------|------------------|---|
| 1. Electron Gun | 8. Q-Magnet | 15. Auxiliary Power Supplies I, II, III |
| 2. Subharmonic Buncher | 9. Ion Pump | 16. Sub-Control Console |
| 3. Prebuncher | 10. Beam Shutter | 17. Main Control Console |
| 4. Acceleration Tube I | 11. Krystron | |
| 5. " II | 12. Pulser | |
| 6. Steering Coil | 13. AVR | |
| 7. Switching Magnet | 14. Cooler | |