

## Photon Factory

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The "Photon Factory" is a factory to produce the synchrotron radiation ranging from the vacuum ultraviolet to hard X rays for the study of matter in the atomic level. This factory project has been promoted since 1972 by the researchers of wide fields of natural science in Japan. The Science Counsel of Japan recommended the establishment of this factory to the Government in 1974, and the formal authorization by the Government came in the fiscal year of 1978. The total budget of this project approved amounts to  $\text{¥}16 \times 10^9$ , which includes the accelerators, experimental facilities, and buildings.

The main facilities of the factory consist of a 2.5 GeV electron storage ring as a source of the synchrotron light and a 2.5 GeV electron linear accelerator as an injector to the ring. Since the storage ring is a dedicated machine for the users of the synchrotron radiation, the parameters are adapted to give as high a radiation flux as possible, covering the wave length range of greatest interest. For this, the stored current of 500 mA is the ultimate aim and the energy of 2.5 GeV was chosen to get a good flux down to 1 Å. In the first stage, six main beam ports and about twenty stations are planned. These will be extended to ten beam ports and forty stations in the future. At one of the six ports, shorter wave length is made available by incorporating "Wiggler". At the moment superconducting magnet giving a 6 T central field is considered for the vertical wiggler which could give good radiation flux down to about 0.1 Å. The electron

beams are provided twice a day by a 2.5 GeV electron linear accelerator which has a peak current of 50 mA with a pulse width of 1.0  $\mu\text{sec}$  and a repetition rate of 50 Hz. The parameters of the accelerators are listed in Tables 1 and 2. The whole layout of the factory is shown in Fig. 1.

The detailed design of the facilities has been already finished and the construction will start in April, 1978. It will take four years, and the experiments are expected to begin at the end of 1983.

Table 1.

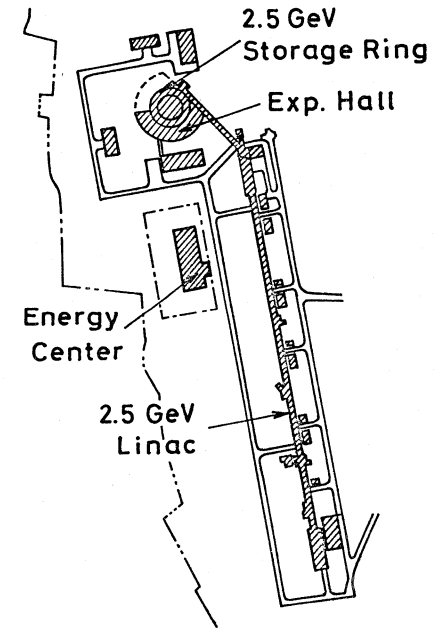
Basic parameters of the storage ring

Energy	2.5 GeV
Stored current	500 mA
Bending radius	8.33 m
Field strength of bending magnet	10 KG
Mean radius	28.4 m
Number of bending magnets	28
Number of quadrupole magnets	58

Table 2.

Basic parameters of the linac

Energy	2.5 GeV
Peak current	50 mA
Repetition rate	$\leq 50$ Hz
Pulse duration	$> 1.0 \mu\text{sec}$
Total length	400 m



Plan view of Photon Factory

Fig. 1