Central Japan Synchrotron Radiation Research Facility Project

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Introductoin

A synchrotron radiation facility that is used not only for basic research, but also for engineering and industrial research and development has been proposed to be constructed in the Central area of Japan, and the prefectural government, industries, universities, and research institutes in the Aichi area are working together to realize this proposal. The key equipment of this facility is a compact electron storage ring that is able to supply hard X-rays. The circumference of the storage ring is 72 m with the energy of 1.2 GeV and the natural emittance of 53 nmrad. The configuration is based on four triple bend cells with twelve bending magnets. Four of them are 5 T superconducting ones and the critical energy is 4.8 keV.

Construction Schedule

2009. Site formation for the buildings construction

2012. First synchrotron light

Top-up operation will be started in near future.

Management

This facility will be used also for industrial research and development. Aichi Science & Technology Foundation is responsible for the operation and management, and Nagoya University Synchrotron Radiation Reseach Center is responsible to run the facility and support the users technicalluy and scientifically.

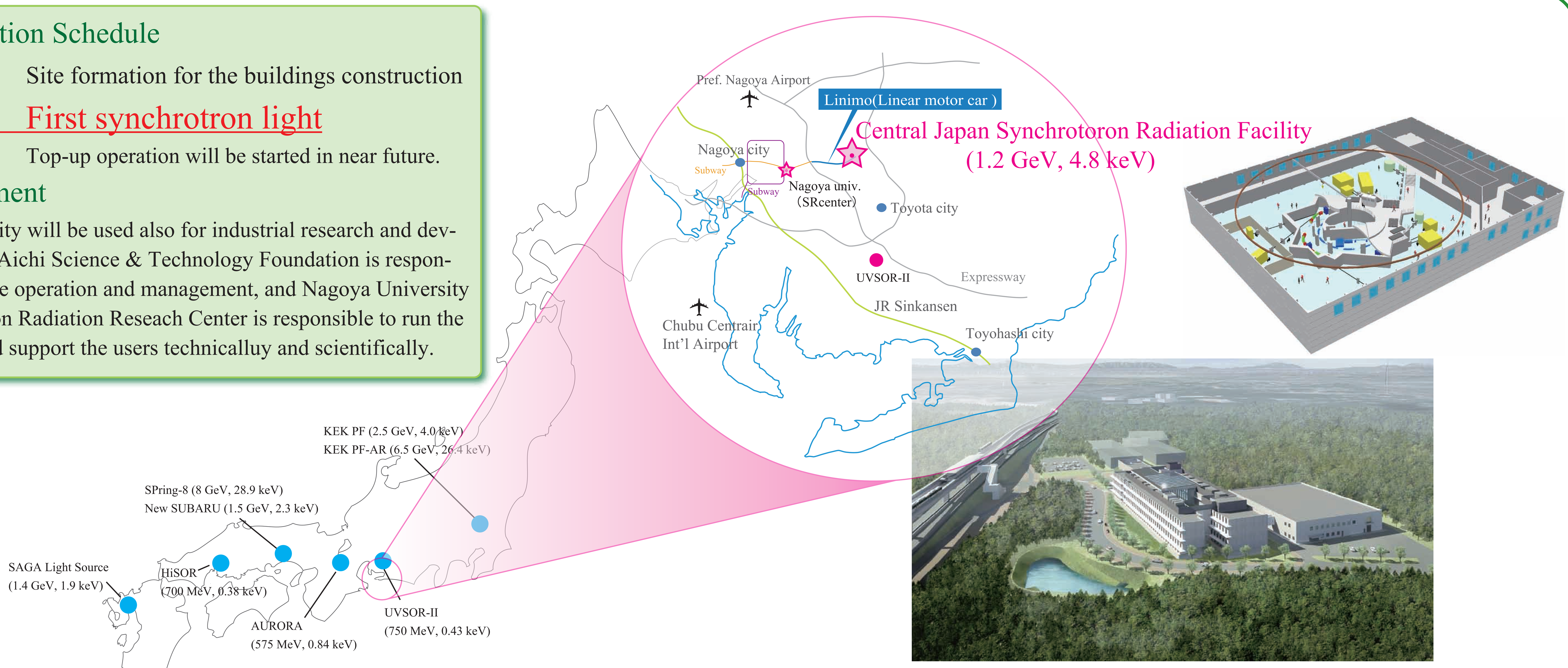

Figure 1. Central Japan Synchrotron Radiation Facility and SR facilities in japan

Beamlines & Accelerators

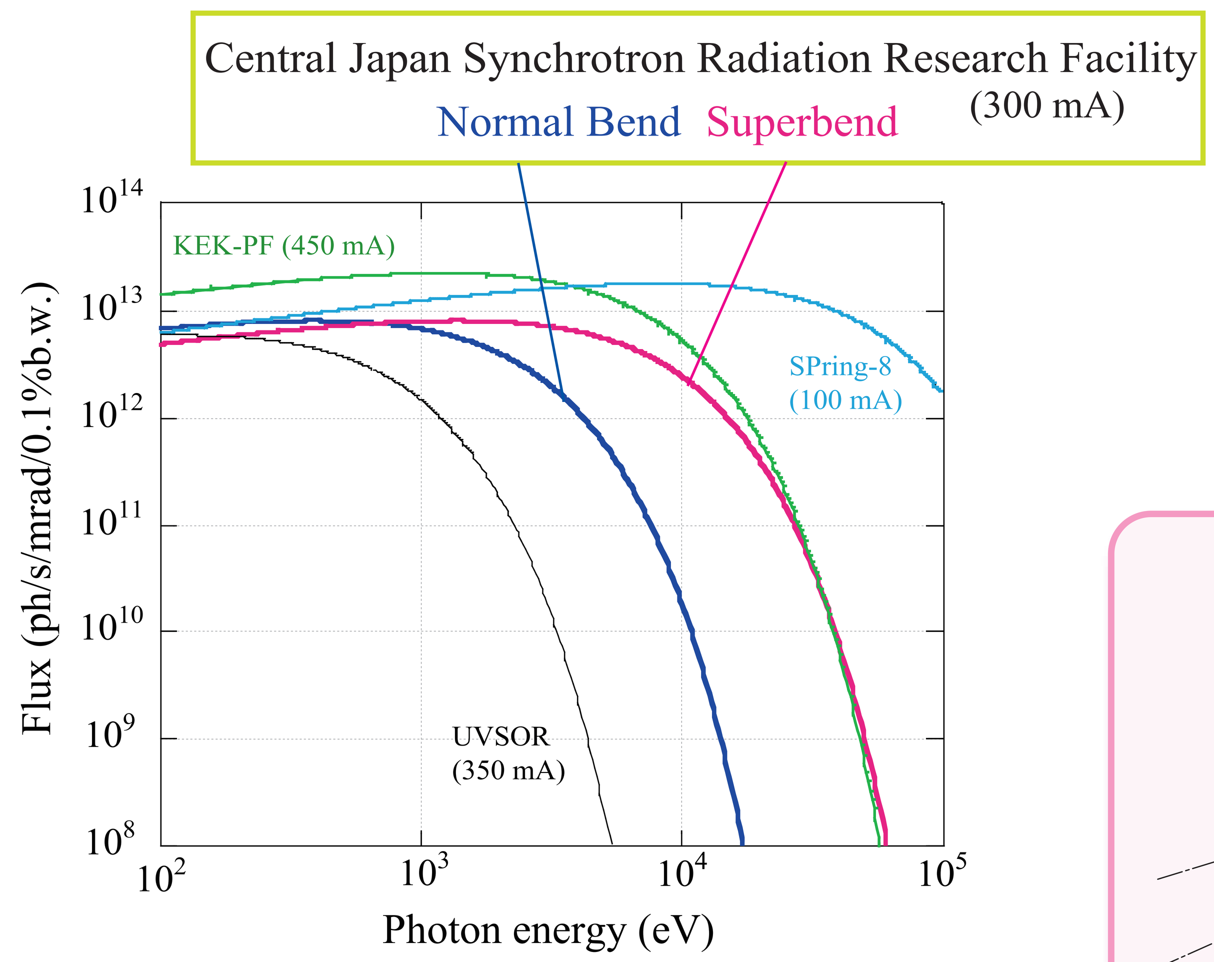

Figure 2. Spectra of photon flux from bending magnets

Table 1. Six beamlines constructed in the first phase

Beamlines	Energy Range (keV)	Flux (photons/sec)	Energy Resolution (E/ΔE)
Hard X-ray XAFS	5 - 20	1×10^{11}	7,000 @ 12 keV
Soft X-ray XAFS	0.85 - 6	7×10^{10}	2,000 @ 3 keV
VUV & Photoemission Spectroscopy	0.03 - 0.85	1×10^{13}	10,000 @ 200 eV
Small angle X-ray Scattering	8.2	7×10^{10}	2,000 @ 8.2 keV
X-ray Diffraction	5 - 20	1×10^{11}	7,000 @ 12 keV
X-ray Fluorescence & Reflectivity	5 - 20	1×10^{11}	2,000 @ 12 keV

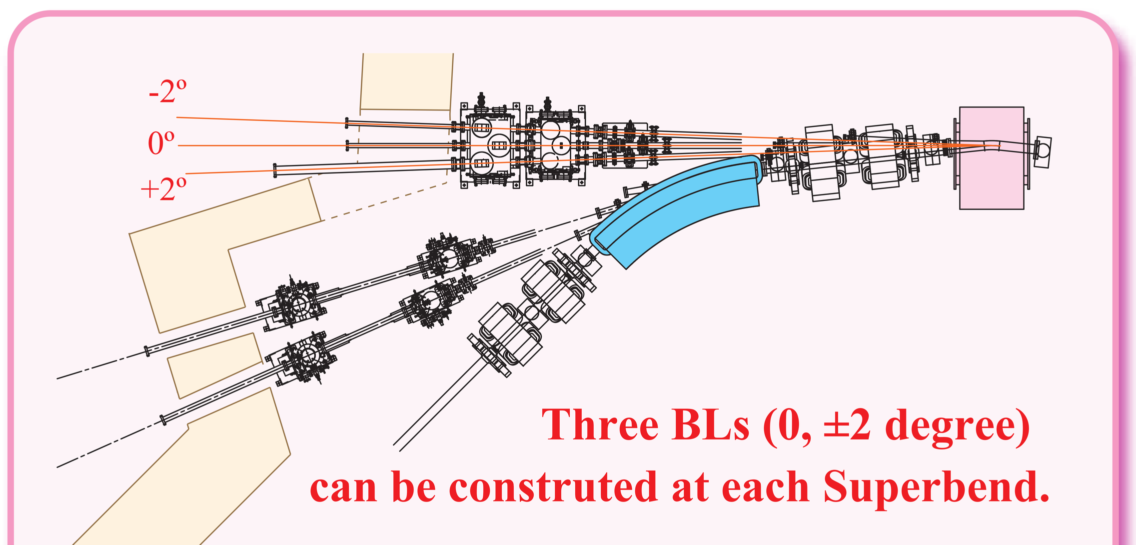

Figure 3. Schematic view of BM front-ends.

Table2. Parameters of Accelerators

Storage Ring	
Beam energy	1.2 GeV
Circumference	72 m
Current	>300 mA
Natural emittance	53 nmrad
Betatron tune	(4.72, 3.23)
RF frequency	500 MHz
RF Voltage	500 kV
RF bucket height	> 0.990 %
Harmonics number	120
Energy spread	8.41 x 10^{-4}
Magnetic lattice	Triple Bend Cell x 4
Normal bend	1.4 T, 39° x 8
Superbend	

Booster synchrotron	
Max. beam energy	1.2 GeV
Circumference	48 m
Current	> 10 mA
RF frequency	500 MHz
Injector linac	
Beam energy	50 MeV
Current	5 ~ 50 mA
Pulse length	5 ~ 100 ns
RF frequency	2,856 MHz

Table 3. Parameters of the Superbend

York type	C type	Length	< 950 mm
Peak field	> 5 T	Hight	< 3000 mm
Bending angle	12° (1.2 GeV)	Width	< 900 mm

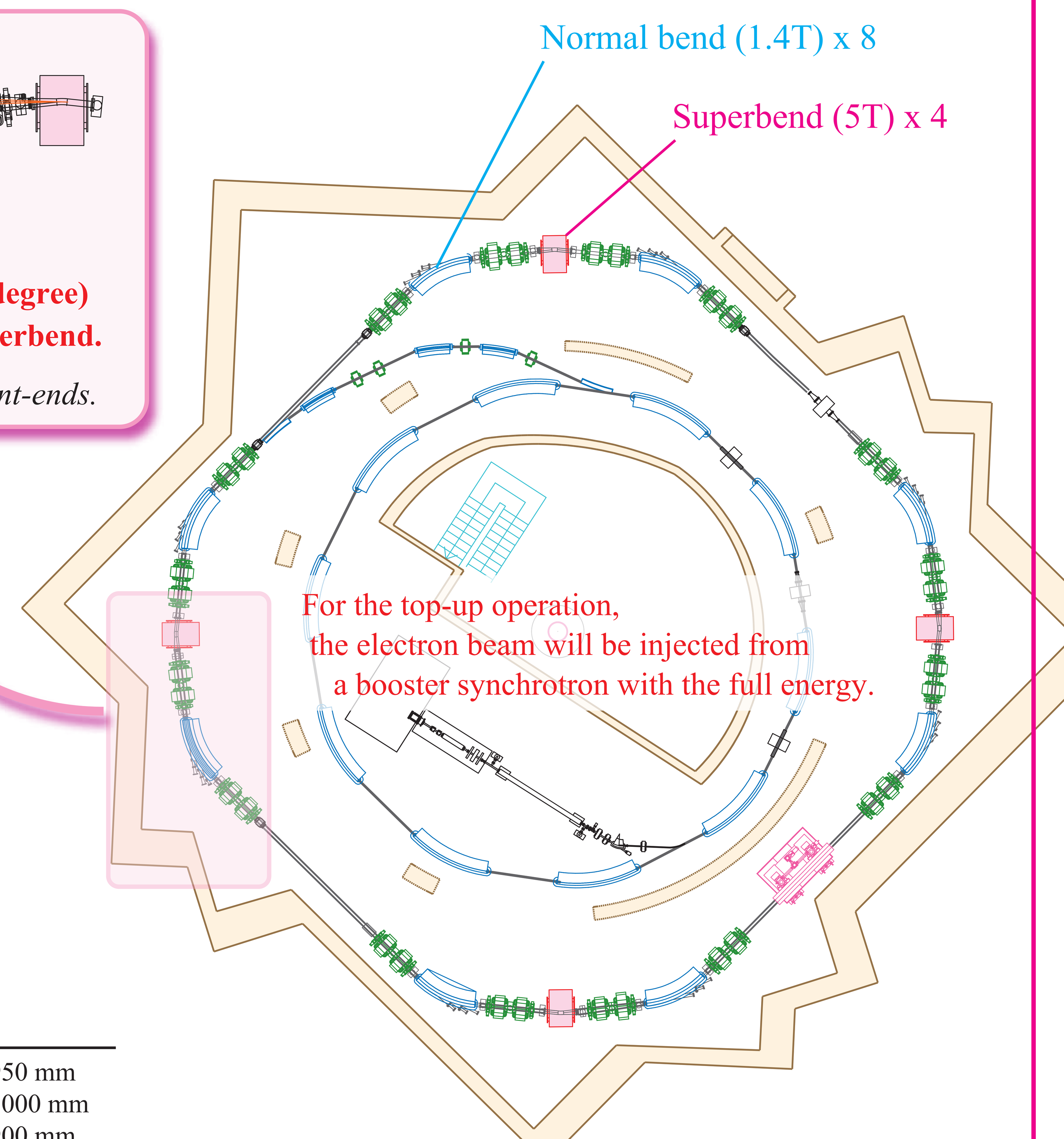

Figure 4. Schematic view of the accelerators