From HiSOR to HiSOR-2

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The HiSOR has been operational since 1996 [1]. It is a compact racetrack-type storage ring having 22 m circumference and 700 MeV electron energy. It has two 180-degree normal-conducting bending magnets which generate a strong magnetic field of 2.7 T. Due to this compact configuration, the natural emittance of the electron beam is 400 nm-rad, which is much larger than most of other operational synchrotron light sources. It has two straight sections, where two insertion devices, a planar undulator and an APPLE-II undulator, are operational, which cover the VUV spectral range. The high field bending magnets produce synchrotron radiation in a wide spectral range including tender X-rays. The injector of HiSOR is a microtron which provides 150 MeV electron beam. After accumulating about 300 mA beam, the beam energy is ramped up to 700 MeV. Beam injection is made twice a day, at 9:00 and 14:30.

For the future plan of HiSOR, we have been designing a compact storage ring which would achieve higher brightness, more undulators and more stable operation with top-up injection. Various lattice designs have been considered [2]. The target parameters are as follows; the beam energy around 600 MeV or less, the circumference smaller than 50 m, the numbers of insertion devices larger than 4. The latest version is based on a compact double-bend achromat cells with six straight sections. The beam energy would be 600 MeV and the circumference would be about 44 m. The ring would be equipped with a full energy injector to enable the top-up injection. The present injector, the microtron, would be used for a pre-injector. All the accelerator components would be constructed in the present building. The emittance of the new ring would be smaller than the present HiSOR by a factor of about 20, consequently, the brightness of the undulator radiation would be increased by two orders of magnitude. The top-up operation would enable stable and continuous experiments with a constant beam current.

REFERENCES

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