3 Research and Developments at the PF Storage Ring

3-1 Upgrade of the Straight Sections at the PF Storage Ring

We have proposed the upgrade plan of the straight sections, where the insertion devises, RF cavities and injection system are installed. The upgrade is realized by placing new quadrupole magnets with shorter length and higher field gradient closer to neighboring bending magnets. In addition, the vacuum ducts and the front end of beam lines are replaced to avoid an interference with the magnets. Figure 1 shows the present and upgraded lattice configurations. As a result, four short straight sections of about 1.5 m are newly created. Furthermore, two long straight sections of 5 m are extended in those of about 9 m, and other sections are also extended. The optical functions are shown in Fig. 2. The beam parameters are almost the same as present ones. However, the longer undulators with planar or helical magnet configurations and mini-pole undulators with a narrower gap at a short straight section may be installed due to the upgrade. Figure 3 shows typical spectra produced by the mini-pole undulators.

We are going to reconstruct the front ends of BL01, BL05 and BL15, and to fabricate the prototype of new quadrupole magnets in FY2002.

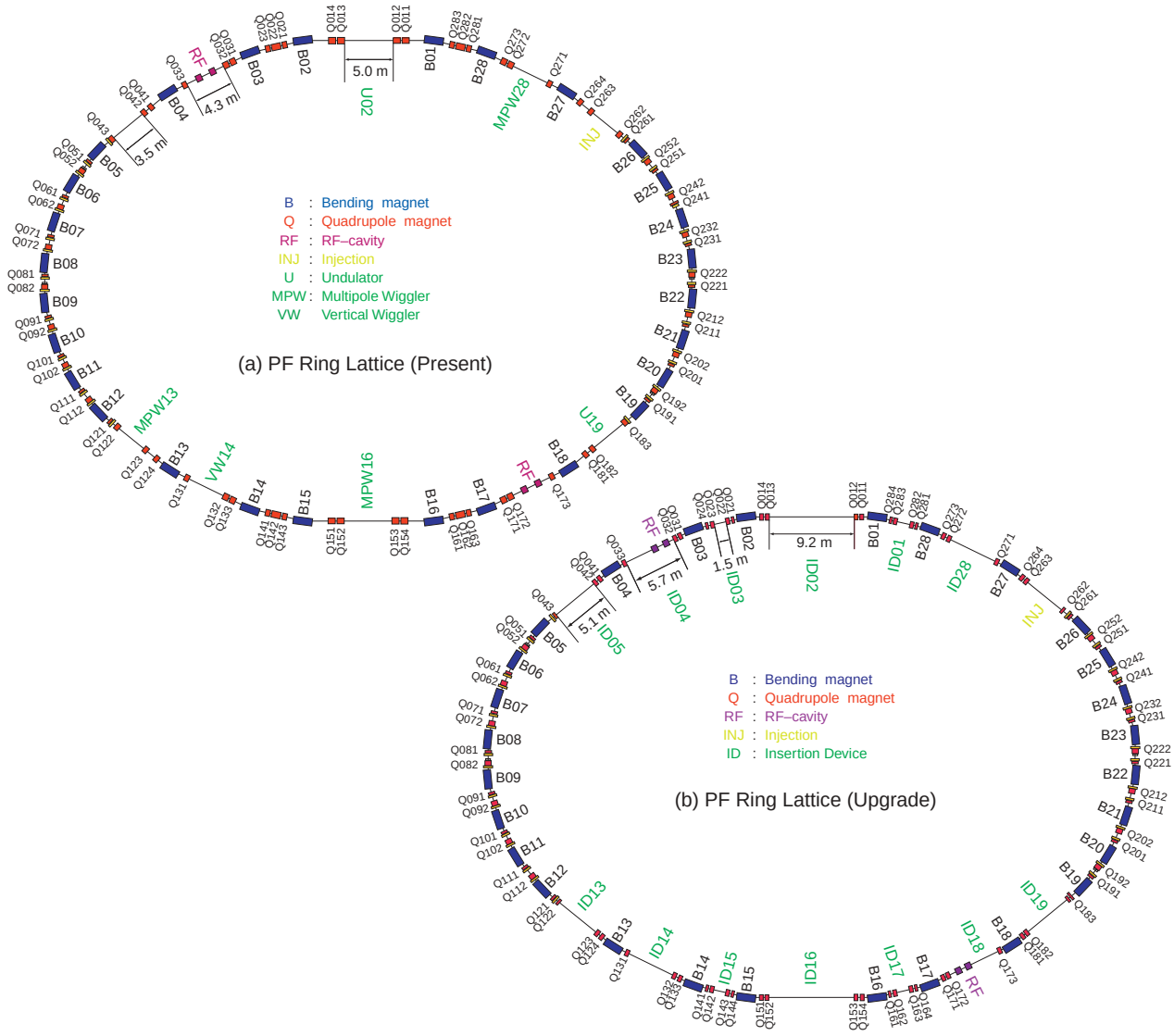

Figure 1
Lattice configurations of the PF Storage Ring; (a) present lattice and (b) upgraded lattice.

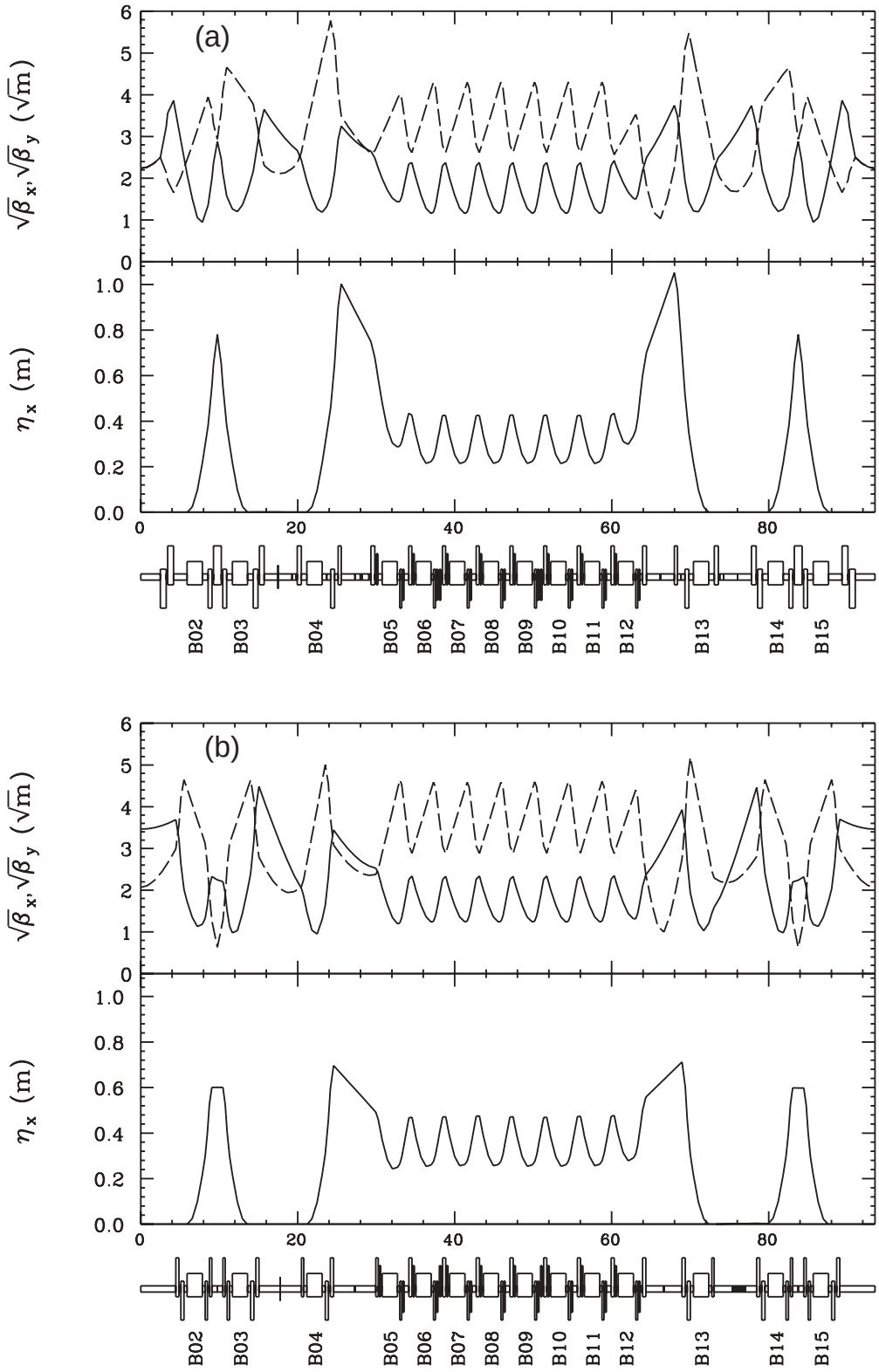

Figure 2
Optical functions in the half of the ring; (a) present one and (b) upgraded one. Top views show the root of beta function and bottom views show horizontal dispersion function. In the top views, the solid and dashed lines indicate the root of horizontal and vertical beta function, respectively.

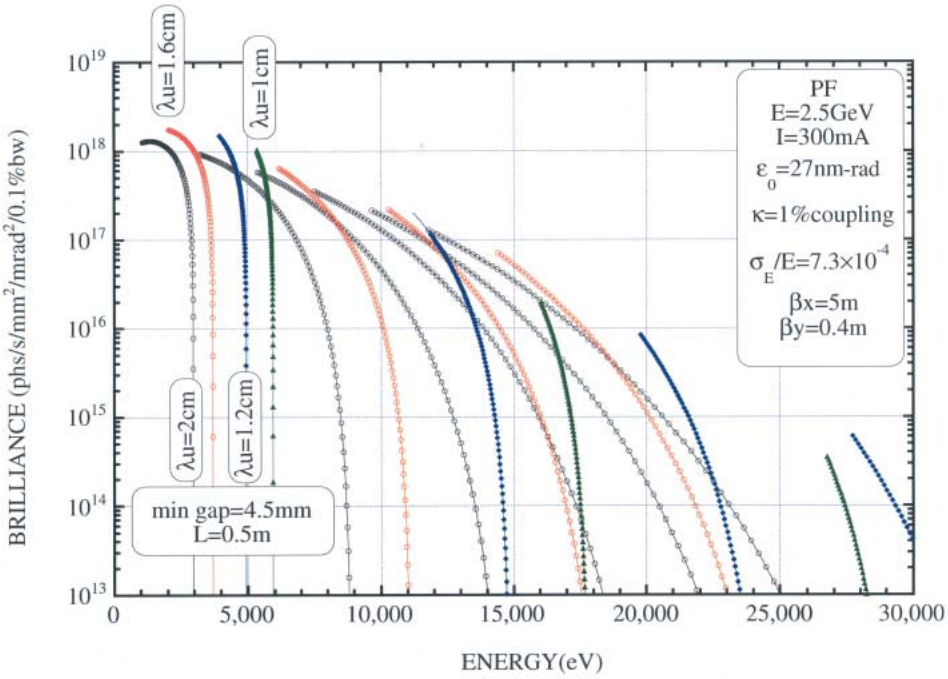

Figure 3
Typical spectra produced by the mini-pole undulators with a narrower gap.