

Undulator and Photon Spectrum at DSR, N. INABE, T. KATAYAMA, and M. WAKASUGI, RIKEN - High resolution X ray spectroscopy experiment is proposed in RIBF program. In this experiment, we measure the isotope shift in atomic transition of highly charged RI beam in DSR for systematic study on the nuclear charge radii of radioactive isotopes far from stability. The radiation from an undulator in DSR in which the electron beam is stored with the energy of 0.3-2.5 GeV is used in this experiment. The linear undulator was designed so as to irradiate the intense X ray with the energy of 30- 2000 eV. This undulator has 6-m length and 200 periods. The X ray energy has to be continuously tunable because of the requirement from the experiment. This is realized with the tunability of the K value (0.3-2.0) by changing the pole gap with the step of less than 5 μm . The undulator is in-vacuum type because the pole gap is too narrow to insert a vacuum chamber; the gap is changed from 1 to 3 cm. With the low emittance operation mode of DSR, the emittances of the electron beam are $\epsilon_x/\epsilon_y = 8.54/25.5$ nmrad at the beam energy of 2.5 GeV and the beam current of 0.5 A. The photon flux of about 10^{18} photons/s mrad² 0.1% b.w. on the beam axis can be kept in the energy range of 100-2000 eV by changing the electron energy and K value. The maximum photon flux is obtained at the electron energy of 1.2 GeV.