

Magnet Design for the Synchrotron Light Source

ANKA, D. EINFELD, A. KRUESSEL, FHO EMDEN - ANKA, a 2nd to 3rd generation 2.5 GeV light source is proposed to be built at the Research Center Karlsruhe, Germany. This source will be dedicated to the fabrication of microstructure and X-ray analysis. The magnet system exist of 16 bending magnets, 40 quadrupoles, 24 sextupoles and 40 steerers. The nominal bending flux of the bendings is 1.5 T and the gap height is 40 mm. The dimensions of the lamination have been optimized to reach the required homogeneity ($\Delta B/B \approx 2 \cdot 10^{-2}$ for ≈ 20 mm) and to minimize the material costs. For the design of the quadrupoles with an aperture of 70 mm a comparison between existing designs has been made. It was however chosen to take a new pole profile with a cone width in order to get a large gradient (20 T/m) with a small amount of saturation (8%). The layout of the coils lead to a pretty low consumption [$l = 0.42$ m, $P = 2.1$ kW and $l = 0.35$ m, $P = 1.67$ kW]. The sextupole design ($l = 0.1$ m) with a differential gradient of $g' = 750$ T/m² is based upon the BESSY II type and the steerer design is according to the APS one.