

Accurate and Efficient Computation of Synchrotron Radiation in the Near Field Region,
O. CHUBAR, P. ELLEAUME, ESRF - A computer code called Synchrotron Radiation Workshop (SRW) is presented. It computes the synchrotron radiation from electrons precisely and efficiently in the near and far field range based on the scalar diffraction theory of Helmholtz-Kirchoff. The codes accept an arbitrary magnetic field description which includes undulators, wigglers, bending magnet (central and edge), quadrupole, etc. The polarization, spatial and angular intensity and phase are accurately computed for a filament or thick electron beam from the millimetre range (1 meV) to the very hard X-rays (1 MeV). For long wavelength, an efficient wavefront type of propagation is implemented using Fourier Optics which handles any number of drift space, rectangular diffracting aperture, lens or focusing mirror. Among other things, SRW is useful to design electron beam diagnostics for an synchrotron source such as electron emittance diagnostic from bending magnet centre or edge radiation or beam position monitoring in quadrupole using the visible or infra-red radiation. The code operates on PowerMac and Windows95/NT under the Igor Pro package. It is driven by command line and/or dialog box with on line help.