

Vector Polarimeter using Synchrotron Radiation for Linear and Circular Electron Colliders,
I.P. KARABEKOV and S.I. KARABEKIAN, Yerevan Physics Institute, Yerevan, Armenia - A method and facility to measure the longitudinal and transverse polarization of an electron beam in a linear or circular accelerator using synchrotron radiation created by a three-pole high-field-intensity wiggler magnet is proposed. Quantum theory predicts that a longitudinally polarized electron emits a slightly different number of synchrotron photons into the space above and below the orbit plane. According to the theory, the total intensity of synchrotron radiation depends on a degree of transverse polarization too. The facility for simultaneous measurement of both longitudinal and transverse polarization uses two synchrotron radiation beams extracted from opposite field direction parts of the wiggler. Using these two beams we avoid the large source of statistical error connected with vertical motion of the beam at a longitudinal polarization measurement. By measuring a flux difference of these two beams, one can determine the degree of transverse polarization. The analyzing power of the method calculated for HERA electron beam parameters is one order of magnitude higher than that of the presently used Compton polarimeter.