The 50 keV Source of Polarized Electrons at ELSA: Past and Future

Maren Eberhardt, Jürgen Wittschen, Wolfgang Hillert, Michael Gowin, Bernhard Neff

University of Bonn, Physics Institute, Nussallee 12, 53115 Bonn, Germany

Since 2000 an inverted source for polarized electrons is in use at the electron stretcher accelerator ELSA of Bonn university. Within several years of operation for the GDH experiment, the gun provided a pulsed beam with high polarization and intensity using a single strained-layer superlattice photocathode. The generation of rectangular shaped pulses with 100 nC charge is achieved by optical pumping with a flashlamp-pumped Ti:Sapphire laser and space charge limited emission at 50 keV. Continuous degradation of the photocathode due to oxygen deposition on the surface which could not be removed completely by heat cleaning at moderate temperatures had been observed. In order to enhance the reliability and uptime of the source, a new loadlock system with crystal storage and atomic hydrogen cleaning will be installed in the near future.