IV-02

Characteristics of a multilayer mirror polarimeter for measurements at extreme ultraviolet wavelengths

Matthew P. Bailey and Reinhard F. Bruch
Department of Physics, University of Nevada, Reno, Reno, NV 89557, U.S.A.

A. Shevelko
Optical Division Lebedev Physical Institute, Russian Academy of Sciences, Moscow, Russia

A. Vasilyev
Department of Physics, University of Notre Dame, Notre Dame, IN 46556, U.S.A.

Multilayer interference devices are extremely useful for exploiting the polarized extreme ultraviolet (EUV) properties of synchrotron radiation. We have developed and tested a multilayer mirror (MLM) polarimeter optimized for λ = 304 Å using electron impact on helium. Specifically we present the first experimental results of the polarization of the EUV Lyman-α emission from He^+ [HeII (2p) $^2P^\circ \rightarrow$ (1s) ^2S] as a function of the electron impact energy for energies ranging from 70 to 980 eV. A major challenge to performing this measurement is the suppression of the dominant HeI (1snp) $^1P^\circ \rightarrow (1s^2)\ ^1S$ radiation originating from the excitation of helium. Excellent spectral selectivity has been achieved with a VYNS copolymer filter whose transmission ration of HeII to HeI emission has been measured to be greater than 1200:1. Additionally, we have measured the instrumental polarization using two identical MLMs in a crossed polarizer configuration.