OPTICA APPLICATA online
A quarterly of the Institute of Physics, Wroclaw University of Technology
open access
Wroclaw University of Technology
INSTITUTE OF PHYSICS

Optica Applicata 2004(Vol.34), No.3, pp. 427-438

Electrical substitution cryogenic radiometer based spectral responsivity scale between 250–2500 nm wavelengths

Özcan Bazkir, Farhad Samedov

Keywords

electrical-substitution cryogenic radiometer, electrically calibrated pyroelectric radiometer, trap detector, radiant source, optical power, responsivity

Abstract

This paper presents the spectral responsivity scale between 250–2500 nm developed by the National Metrology Institute of Turkey (UME). For that purpose silicon photodiode based trap detector and electrically calibrated pyroelectric radiometer (ECPR) that were calibrated against primary level absolute electrical substitution cryogenic radiometer (ESCR) were used as transfer standards. Using highly collimated and stabilized (10^{-5}) lasers, absolute optical powers and absolute responsivity of trap detector were measured with an uncertainty of the order of 10^{-4}. In visible (VIS) region responsivity scale was set by means of the models for the reflectance and internal quantum efficiency. In the ultraviolet (UV) and near-infrared (NIR) regions spectrally flat (0.1%) ECPR was used.

785.6 kB