Pembuatan alat eksperimen difraksi cahaya berbasis Vision Assistant dan Labview = The making device of diffraction light experiment based on Vision Assistant and Labview

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Abstrak

[ABSTRAK
Dalam penelitian ini, telah dibuat sebuah alat ukur yang dapat mengukur panjang gelombang cahaya. Dengan memanfaatkan fenomena sifat cahaya, penulis ingin mengetahui besar nilai panjang gelombang dan pola distribusi intensitas difraksi pada cahaya yang melewati kisi difraksi apakah sesuai dengan teori berdasarkan referensi. Sumber cahaya yang digunakan berupa sinar laser merah monokromatik dan polikromatik yang menghasilkan warna RGB serta lampu merkuri. Kisi difraksi dan sumber cahaya digerakkan dengan motor DC yang dilengkapi rotary encoder untuk menentukan posisinya. Semua pergerakan alat ini dikendalikan oleh program LabVIEW National Instrument dan pengolahan gambar dilakukan dengan program Vision Assistant. Hasil yang diperoleh dalam penelitian ini yaitu sumber cahaya merah monokromatik dengan kisi difraksi 300 garis/mm, panjang gelombang cahaya yang dihasilkan (640 - 676) nm dengan besar kesalahan relatif sebesar 0,32 %. Warna biru dengan kisi 600 garis/mm, panjang gelombang cahaya yang dihasilkan (454 - 475) nm, dengan besar kesalahan relatif sebesar 0,31 %. Warna hijau dengan kisi 600 garis/mm, panjang gelombang cahaya yang dihasilkan (524 - 547) nm, dengan besar kesalahan relatif sebesar 0,19 %. Warna merah dengan kisi 600 garis/mm, panjang gelombang cahaya yang dihasilkan (654 - 697) nm, dengan besar kesalahan relatif sebesar 0,34 %. Semakin besar orde difraksi maka semakin lemah tingkat intensitas yang dihasilkan.
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ABSTRACT
In this research, has created a measuring instrument which can measure light intensity distribution pattern. By exploiting phenomenon the nature of light, the author would like to know the value of wave l ength and the intensity distribution of the diffraction pattern on laser light that passes through a diffraction grating so it can be appropriate to reference theory. The source of light use red of monochromatic, polychromatic light which produce RGB color and mercury lamp. Grating diffraction and source of light are moved by DC motor with go forward and go back moving, which next by rotary encoder change distance become counter in partition. The all of these moving are manage by LabVIEW National Instrument and processing of image is executed of Vision Assistant program. The result of research is red monochromatic with

width diffraction grating 300 lines/mm, is produced wave length of light (640 - 676) nm with relative error 0,32 %. For blue color with width diffraction grating 600 lines/mm, is produced wave length of light (454 - 475) nm with relative error 0,31 %. For green color with width diffraction grating 600 lines/mm, is produced wave length of light (524 - 547) nm with relative error 0,19 %. For red color with width diffraction grating 600 lines/mm, is produced wave length (654 - 697) nm with relative error 0,34 %. The greater order of diffraction then the less level of intensity was resulted.;In this research, has created a measuring instrument which can measure light intensity distribution pattern. By exploiting phenomenon the nature of light, the author would like to know the value of wave l ength and the intensity distribution of the diffraction pattern on laser light that passes through a diffraction grating so it can be appropriate to reference theory. The source of light use red of monochromatic, polychromatic light which produce RGB color and mercury lamp. Grating diffraction and source of light are moved by DC motor with go forward and go back moving, which next by rotary encoder change distance become counter in partition. The all of these moving are manage by LabVIEW National Instrument and processing of image is executed of Vision Assistant program. The result of research is red monochromatic with width diffraction grating 300 lines/mm, is produced wave length of light (640 - 676) nm with relative error 0,32 %. For blue color with width diffraction grating 600 lines/mm, is produced wave length of light (454 - 475) nm with relative error 0,31 %. For green color with width diffraction grating 600 lines/mm, is produced wave length of light (524 - 547) nm with relative error 0,19 %. For red color with width diffraction grating 600 lines/mm, is produced wave length (654 - 697) nm with relative error 0,34 %. The greater order of diffraction then the less level of intensity was resulted.;In this research, has created a measuring instrument which can measure light intensity distribution pattern. By exploiting phenomenon the nature of light, the author would like to know the value of wave l ength and the intensity distribution of the diffraction pattern on laser light that passes through a diffraction grating so it can be appropriate to reference theory. The source of light use red of monochromatic, polychromatic light which produce RGB color and mercury lamp. Grating diffraction and source of light are moved by DC motor with go forward and go back moving, which next by rotary encoder change distance become counter in partition. The all of these moving are manage by LabVIEW National Instrument and processing of image is executed of Vision Assistant program. The result of research is red monochromatic with width diffraction grating 300 lines/mm, is produced wave length of light (640 - 676) nm with relative error 0,32 %. For blue color with width diffraction grating 600 lines/mm, is produced wave length of light (454 - 475) nm with relative error 0,31 %. For green color with width diffraction grating 600 lines/mm, is produced wave length of light (524 - 547) nm with relative error 0,19 %. For red color with width diffraction grating 600 lines/mm, is produced wave length (654

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