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DESIGN PRINCIPLES OF THE LVT-2 MODEL LASER INSTRUMENT FOR THE MEASUREMENT OF VISUAL CHARACTERISTICS

by

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HUMAN TRANSLATION

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DESIGN PRINCIPLES OF THE LV-2 MODEL LASER INSTRUMENT FOR THE MEASUREMENT OF VISUAL CHARACTERISTICS

Sun Wende

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As far as the LVT-2 model laser visual acuity measuring instrument, after its model improvement, is concerned, it not only is capable of measuring the visual acuity of retina (LVA), but also capable of measuring the MTF of retina. The light path system of the instrument has three sections. One is a double light bundle common path interference system making use of double Dufu prisms to divide bundles. In conjunction with this, it uses the movement of a reflection lens M_2 in order to change the interval distance of the two mutually interfering bundles. As a result of this, it changes the spacial frequency of the interference bands. This acts as the light path to measure LVA. The second is the background light set composed of such compoments as the tungsten filament lamp T_L, the interference filter optical plate OF, and the polarization lens $P_{2(\text{unclear})}$. It is used in order to form, on the retina, a uniform background base light. In conjunction with this, through adjustments of the dispersion prism B in the light path, adjustments are made in the degree of contrast change I_0/I_u, measuring the MTF of the retina. The third is the interference band observation system. It makes use of a semitransparent-semireflective lens to take the interference light path and rotate it 90°. After that, it makes use of lens L_6 to gather the light into the observer's eye in order to facilitate medical viewing during the process of observation and testing. The light path structure of the instrument in question is compact and efficient and is unusually stable in terms of vibration. (155)

- Chinese Translation

THE USE OF FULL INFORMATION WAVE BAND SECTIONS IN SOLAR ENERGY TRANSFORMATIONS

Bo Xiuhua

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Phase full information wave band sections possess, at the same time, light focusing and chromatic dispersion characteristics. Moreover, in the same medium or dielectric layer, it is possible to record a certain full information or data diagram. These type of characteristics supply the possibility of selecting different geometrical configurations for different wavelengths. It is possible, under condtions in which the angle of entry or angle of incidence is the same, to take various types of wavelengths and redisplay the full data diagram. On the basis of this, we took double light exposure phase full information or data wave band sections (zone plates) and used them in solar energy transformations. The transformation efficiency reached 35%. This is 2.5 times higher than the transformation efficiencies for semiconductor solar energy batteries using the standard types of materials. (156)

TeO_2 HIGH RESOLUTION ACOUSTIC-OPTICAL RADIO FREQUENCY SPECTRUM INSTRUMENTS (AOS)

Huang Gengchen (Academia Sinica, Shanghai Silicate Institute), B.J. Robinson (Australian CSIRO Radio Physics Institute), and Wang Jingsheng (Academia Sinica, Yunnan Astronomical Observatory)

Acoustic-optical radio frequency spectrum analysis is aided by high resolution acoustic-optical devices to take radio signals and carry out an optical simulation process. After enlarged sheaf lasers have been deflected, one goes through Fourier lens transformations, taking the spacial distribution of radio frequency spectra formed on their rear focus plane. One makes use of electro-optical dipole tube array PDA to carry out electro-optical investigations and

measurements. Following that, by using the products of computer processing, it is then possible to obtain the radio signal frequency spectrum structure. After precisely determining PDA matrix element numbers, intervals, and Fourier lens focus distances, their resolutions are principally decided by the opening functions of instruments. The increase in resolution will cause side lobes to clearly increase in size. The two of them are a pair of parameters which mutually restrain each other. It is necessary to make minute adjustments in the intercept ratios of the Gauss light bundles. One obtains the optimum resolutions for getting restrained side lobe levels that are capable of being received. The band width that the instrument makes use of is 10.5 MHz. When operating with signal powers of 100 mW and below, it is placed in the linear zone. The AOS resolution level is 28 kHz. (157)

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UTILIZATION OF BSO CRYSTALS IN REAL TIME DIFFUSED STRIATION SHEAR PHOTOGRAPHS

Wang Tianji, Li Yaotang, Fan Xiaowu, and Zhang Shichao (Academia Sinica, Guangzhou Electronics Technology Research Institute) Yu Yongan (Hong Kong Qinhui Institute, Physics Dept)

Real time diffused or scattered striation shear photographic equipment is a new type of method for doing real time storage and observation of diffused striation shear samples. The recording medium which it makes use of is the electro-optical crystal bismuth silicon oxide (acid) ($Bi_{12}SiO_{20}$) which displays changes in rates of diffraction caused by light. $Bi_{12}SO_{20}$ crystals, when in electric fields with voltages of 6kV/cm and wavelengths of λ_1-514nm, achieved 1% rates of effective diffraction for which input energies were 0.3 mJ/cm^2. Its absorption coefficient for wavelengths of λ_1= 514nm was a_1= $2cm^{-1}$. For wavelengths of λ_2= 633nm, the absorption coefficient was a_2=$0.28cm^{-1}$. The crystal in question is a type of erasable recording medium. Because of this fact, it is possible to reuse it several times and no fatique or damage will show up. As far as the utilization of this crystal equipment as a mechanism for photographing real time diffused striation shear is

concerned, it is possible to make use of it in measurements of real time strain and in the observation and measurement of real time situations not involving damage. (158)

HIGH SPEED INSPECTION AND RECORDING TECHNOLOGY FOR PHASE BODIES

Hu Dejing and Cao Zhengyuan (Tongji College)

The basic principle in the technology of high speed inspection and recording of phase bodies is to take full data storage and full data interference techniques with the two light exposure method and real time methods associated with them and combine them together. One makes use of quasi-Fourier transformation light paths. Through Fourier transformation full data or full sensing photography, one uses double light exposure methods and takes two before and after status high speed recordings of the same point on full data photographic negatives. This is done in order to supply data for observation, analysis, and quantitative calculations. The greatest advantage of this type of method is speed. Because of this, it is possible to carry out non-contact type low speed dynamic measurements. It is also possible to carry out continuous measurements and on-site measurements. Besides this, the recording surface is small, it saves photographic negatives, and developing is simple, convenient, and economical. This method is easy to read out. Moreover, it is also capable of being reproduced. With the use of spectra through photographic negatives, it is possible to directly make light sensitive recordings. (159)

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