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05.03.10 The Nature of BL Lacertae. J. A. BALDWIN, L. B. ROBINSON, and E. J. WAMPLER, Lick Observatory, Univ. of Calif., Santa Cruz, and E. M. BURBIDGE, Univ. of Calif., San Diego - At optical wavelengths the object BL Lac consists of a central star-like component surrounded by a faint nebula. We have used the Lick image-tube scanner on the 120-inch (305-cm) telescope to make spectrophotometric measurements of the nebula through a rectangular aperture centered about 7 arc sec NE of BL Lac. Careful tests were made to assess and subtract scattered light from BL Lac, which contributed about 25% to the signal received from the nebula. No absorption features were seen in the nebula and, although the nebular spectrum is curved and steeper than that of BL Lac itself, it is not a good match to the energy distribution of a normal elliptical galaxy. Thus we do not confirm the observations by Oke and Gunn in which absorption features were seen corresponding to those in the spectrum of an elliptical galaxy at a redshift of 0.07. We have found no evidence that the nebula around BL Lacertae is a normal galaxy of stars.

05.04.10 Resolution of Short-Term Optical Activity of BL Lac, ON 231, and ON 325. R. L. Hackney, K. R. Hackney, Western Kentucky University, R. L. Scott, A. G. Smith, R. J. Leacock, B. Q. McGimsey, and P. L. Edwards, Rosemary Hill Observatory, University of Florida. -- Photographic observations of BL Lac, ON 231, and ON 325 were sustained over several months in 1973 and 1974 using the 30-inch and 18-inch telescopes at Rosemary Hill Observatory in an effort to effect almost daily time resolution. The time resolution achieved in the study is sufficient to define the nature of short-term (daily to monthly) variations not well resolved in previous photometric studies of these objects. Outbursts or fluctuations with 0.5-magnitude amplitude and a characteristic time scale of about 5 days are noted as persistent features of the light curve of BL Lac. This time scale appears to have fundamental significance in the continuous activity of BL Lac in both optical and radio wavelengths. The rapidity of optical variations detected in the sources ON 231 and ON 325 is comparable to that of BL Lac, adding to the observational and behavioral parallels previously noted between these objects.

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Session 6: Alpha Room, 1400-1700

Invited

06.0A.12 The Practical Realization of a New Fundamental Reference Coordinate System (FK5) for Astronomy. WALTER FRICKE, Astronomischen Rechen Institute, Heidelberg.

06.01.02 An Investigation of Possible Systematic Error in the Observed Rate of Change of G. T. C. Van Flandern, U.S. Naval Obs. It was reported at the last AAS meeting that the discovery of problems with a numerical integration of the Moon had led to a downward revision of the estimated observed rate of decrease of the Universal Gravitational Constant, G, to $G/G = (-8 \pm 5) \times 10^{-11}/\text{year}$. The estimate is made from an analysis of lunar occultation observations; and the upward revised mean error estimate was intended to cover possible systematic errors in the star coordinate system, in addition to the formal mean error of $\pm 3 \times 10^{-11}/\text{year}$. The effects of systematic errors in the FK4 coordinate system, as measured by several recent Washington transit circle catalogs, are now being investigated in detail, and results will be presented. In addition, a complete power spectrum analysis of the lunar occultation residuals in celestial longitude and latitude has now been performed by Kenneth F. Pulkkinen and the author, resulting in the discovery of a number of apparently significant periodicities in the data. When a cause can be assigned, these periodicities are removed from the residuals. The effects of the remaining terms on the solution for the rate of change of G is then checked. Finally, additional observations have been included in the solution. The net effect is to dispose of a number of potential error sources, and strengthen the solution. A new estimate of the observed rate of change of G will be presented.

06.02.02 A Correlation Study of Solar Wind Velocity Modulation Effects and the Non-10 Related Component of the Jovian Decametric Radiation. J.R. KENNEDY, G.R. LEBO and R.B. POMPHREY, Univ. of Fla. - The period from October 1967 to May 1968 produced a stable two sector solar magnetic field structure in interplanetary space. Auto-correlation of the solar wind velocity shows a periodic component at 13 and 26 days, with respect to Jupiter, corresponding to the half and full solar rotation period. The 26 day component showed a peak of $r = 0.44$. Superposed epoch analysis shows that, in the mean, the date of the sector boundary passage at the earth, occurred at a local minimum in the solar wind velocity, followed by a local maximum 4 to 5 days later. This modulation in velocity should give rise to systematic collisions between the low speed particle streams emitted during the minimums and the high speed streams emitted a few days later. The velocity averaged 440 km/s, with maximum excursions of +388 km/s and -120 km/s. These data indicate that the bulk of the collision interactions would occur before the streams reached Jupiter, thus producing recurrent peaks in the particle flux at Jupiter. Superposed epoch analysis of model particle flux density at Jupiter and measured non-10 related main source decametric radiation shows similar periodic behavior. Cross correlation of these two tables shows a strong peak at zero relative time shift, with a value $r = 0.69$.

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