THE ASTRONOMICAL JOURNAL

PUBLISHED BY THE AMERICAN INSTITUTE OF PHYSICS
FOR THE AMERICAN ASTRONOMICAL SOCIETY

VOLUME 71 1966 August ~ No. 1341 *NUMBER 6*

Abstracts of Papers Presented at 121st Meeting of the American Astronomical Society held 28–31 March 1966 at Hampton, Virginia

Atmospheric Characteristics of a Cepheid of Unusually Large Light Amplitude. HELMUT A. ABT AND PATRICK S. OSMER, *Kitt Peak National Observatory,* AND ROBERT P. KRAFT, *Mount Wilson and Palomar Observatories.*—The nearby Cepheids and those in the Small Magellanic Cloud have very different light amplitude–period relations. TV Camelopardalis is a distant galactic short-period Cepheid of large light amplitude that seems to be like those in the SMC. Since its spectrum has weak lines, it was previously suggested that its composition may be low in metals and that the composition, in some unspecified way, causes unusual light and color amplitudes. The present analysis shows that the metallic abundance is normal to within a factor of about 2, and that the cause of the weak lines is a low turbulent velocity.

Gravitational Instability of a Collapsing Rotating Cloud. THOMAS T. ARNY, *Amherst College Observatory.*—The fragmentation of a rotating, collapsing gas cloud has been studied. Numerical solutions to the linearized perturbed hydrodynamic equations have been obtained for the following conditions in the main cloud: (1) uniform density, (2) zero pressure, (3) initially spheroidal shape, and (4) uniform rotation, the angular velocity being only a function of time.

It is found that fragmentation can occur, but that growth is retarded substantially as the angular velocity of the main cloud increases.

Numerical difficulties are encountered in determining the asymptotic behavior of the fragments. For those cases in which perturbation growth has not occurred by the time the main cloud is flattened so that its equatorial-to-polar axial ratio is 10:1, the solutions suggest that growth will not occur.

A power series solution for the initial stages of collapse shows that the critical parameter is the free-fall time of the perturbation divided by the product of its rotation period and the rotation period of the main cloud. If this ratio is greater than 1.5, growth occurs in all cases studied. The rotation does not ultimately cut off growth since only the Coriolis force appears in the linearized equations. If the ratio cited above is less than 1.5, the perturbation density begins to drop below that of the main cloud. While in some cases growth does occur ultimately, whether this is always true is not certain. In an effort to clarify this point, further computations are in progress.

Burst Structure of Jupiter's Decametric Radiation. EDWARD E. BAART, COLIN H. BARROW, AND RICHARD T. LEE, *Florida State University.*—The structure of the bursts of decametric radiation from Jupiter has been investigated using chart speeds up to 50 mm/sec and time constants down to 5 msec. To make identification of short pulses more certain observations have been made of the left- and right-handed components of the radiation at 16, 18, and 22 Mc/sec, and of the total power at 14 Mc/sec. The polarization measurements have been made using a hybrid ring and separate receivers for the two senses of polarization to avoid the uncertainties which might arise from switching techniques. In addition, the total power was recorded at 18 Mc/sec by using an array having a null in the direction of Jupiter. This antenna served as a monitor to identify static pulses which could have the same appearance as millisecond pulses from Jupiter. A phase-switching interferometer was operated at 18 Mc/sec throughout observing periods as an additional means of identifying that Jupiter was active during the period.

Several distinct forms of burst structure have been observed. In particular pulses as short as or shorter than 10 msec, with different forms of grouping, have been observed on numerous occasions.