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ABSTRACTS *

Gaposchkin, Cecilia Payne. The connection of motion with intrinsic variability.

The Hess diagram of stars in the solar neighborhood differs in a striking way from that of a typical globular cluster selected to represent Type II. The distribution of intrinsic variability within the Hess diagrams also differs: for local stars the maximum frequency of intrinsic (pulsational) variability lies among the moderately bright low-temperature (long-period and semiregular variables), and follows a sparsely populated high-luminosity region towards higher temperatures (Cepheids). The cluster-type variables are represented in small numbers, if at all. For the Type II population the maximum frequency of intrinsic variables probably lies in the region of cluster-type stars, falling towards higher luminosities for lower temperatures (Type II Cepheids) and rising again for low-temperature stars of rather high luminosity (Type II long-period and perhaps semiregular variables).

Classical Cepheids show a distribution of radial velocities characteristic of the galactic rotation; they are closely confined to the galactic plane. Within the galaxy, the periods of classical Cepheids are greatest towards the center, least towards the anti-center. Periods of classical Cepheids fall off with increasing distance from the galactic plane; a second group of Cepheids, with long periods and atypical light curves (the Type II Cepheids) appears at distances from the plane greater than 500 parsecs.

Cluster-type stars show the characteristic velocity-asymmetry of the high-velocity stars; their numbers apparently increase towards the galactic center. They show the smallest density gradient of any type of intrinsic variable perpendicular to the galactic plane. Classical Cepheids and cluster-type stars represent two extremes, between which other intrinsic variables can be placed.

Long-period variables have been separated into two groups: periods less than 250 days (short-long-period variables); periods greater than 350 days (long-long-period variables). In both horizontal and vertical distribution, and in velocity, the short-longs are closer to the cluster-type stars, the long-longs closer to the classical Cepheids. The short-longs appear to increase in number towards the galactic center; the long-longs to be uniformly distributed with respect to our neighborhood. Towards the galactic center, short-longs are more numerous per unit volume (though probably less so than cluster-type stars), towards the anticenter, long-longs are more numerous.

The semiregular variables of moderate luminosity appear to resemble the long-longs in motion and distribution. The high-luminosity semiregular variables may resemble the classical Cepheids more closely, but the material is insufficient.

Analysis of the light curves of classical Cepheids in our neighborhood, in the Large and Small Magellanic Clouds (material provided by Dr. Shapley) and in IC 1613 (material provided by Dr. Baade), shows a general similarity of pulsation pattern; in both clouds, stars that lie below the period-luminosity curve show a given pulsation pattern at smaller periods, and those that lie above the period-luminosity curve, at greater periods, than the average local sample. These differences probably reflect differences of

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