

## CURRENT RESULTS AND SUGGESTIONS FOR FUTURE WORK

M. McCarthy, A.G.D. Philip, I. King, and U. Steinlin

In the days following our Joint Discussion the Co-editors were joined by two of the participants, Dr. Ivan King and Dr. Uli Steinlin, in an effort to evaluate results reported as well as the problems posed for future work. As a result of these discussions at Grenoble the present listing was made. This list was presented to members of the Organizing Committee but since it was impossible in the last days at Grenoble to convene this group or to speak collegially with all participants it must remain the responsibility of the above-named authors. It cannot be a complete resumé nor can it presume to represent adequately the varied opinions expressed at Grenoble on 25 August. We hope here only to attempt a synthesis of certain evident results and to outline certain prospects for exploring further the exciting problems of structure and evolution in the galactic polar caps.

### 1. Current results

There is widespread convergence of results from studies of faint M stars which tends to confirm the conventional luminosity function for the solar neighborhood.

The diversity of luminosity functions (besides the purely local one) as outlined earlier in classical papers, is now clearly confirmed. The luminosity function must be described in terms of a mixture of stellar populations with different concentrations towards the galactic plane.

Recent advances and developments in instrumentation, automation and data reduction techniques have yielded substantial improvements in the measurement of stellar radiation and an increased possibility for the systematic control of errors. Through observations from satellites important regions in the far ultraviolet have become available for photometric and spectroscopic studies. Meanwhile the new infrared techniques yield much needed information especially for the study of late-type stars.

## 2. Problems to be solved

The luminosity function of each component of the galactic population at higher  $z$  distances must be determined separately. To determine the spatial, kinematic and chemical characteristics of these components will be a major task. We must consider how this can be verified by spectroscopic, photometric and kinematic measurements.

The individual M dwarfs found in the direction of the polar caps are undoubtedly authentic. What is needed is a higher accuracy concerning their absolute magnitudes. How can this be best obtained?

Many important problems in radial velocity and parallax remain to be solved, but present techniques and approaches are promising. A moral of our experience is that future progress will depend very much on the accuracy and reliability of our fundamental data.

It is not clear whether studies of the local halo are related to the larger problem of the possibility of a massive halo of the galaxy. Does it exist and how can it be verified?

Photometric methods for a reliable multi-dimensional classification of faint late-type stars which go beyond the limited possibilities of standard three- or four-color photometry must be sought. How can these be best developed?