



Statement of the Study Week on Astrophysical Cosmology and Fundamental Physics



It is an impossible task to do justice to the level of scientific discussion heard during the Study Week on *Astrophysical Cosmology and Fundamental Physics*. All the lectures contained so much new and exciting material on the wealth of physical phenomena which are important in understanding the large-scale structure of the universe.

A striking aspect was the degree of unanimity of the participants on virtually all topics. It was not at all accidental, since there was a very strong Cambridge-Princeton-CalTech atmosphere about the meeting.

It is a credo among many cosmologists that the basic facts of cosmology should be simple. An example of this simplifying trend is the picture of galaxies which is emerging. For virtually all purposes, galaxies were simply objects consisting of 10% visible matter and 90% invisible. These are the building blocks which define the large scale structure of the universe. Individual galaxies look very different and bewilderingly complex, but there was an underlying trend in the discussions that much of this may well be of secondary importance. According to Jerry Ostriker, all you really need to know about a galaxy is its mass. Thus, to a first approximation, all the cosmologists need explain is how objects of different masses formed with 10% visible matter and 90% dark. To anyone but a cosmologist it may be a depressing thought that everything in the universe is simply referred to as "dissipation".

The threads of the broad picture are beginning to be drawn together into a plausible physical picture for the origin and evolution of the universe. Although many of the issues are complex in their workings, the underlying physical ideas have an attractive simplicity. Not only are the physical ideas basically simple, but the present picture of the

observed world of galaxies is becoming simpler.

Facts are relative things and in astronomy they tend to evolve with time. However, at least for a few hours, we had a vision of a comprehensible universe which could be accounted for by the best of contemporary physics.