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SPACE STRUCTURE AND MOTION

By Dr. GUSTAF STRÖMBERG

MOUNT WILSON OBSERVATORY, CARNEGIE INSTITUTION OF WASHINGTON

INTRODUCTION

EVERYBODY is familiar with motion as an observed phenomenon. Motion, however, is not a simple thing, as we shall see in the following, and it has many aspects of extreme interest and far-reaching consequences. The most familiar kind of motion is that when I move my hand, for instance. This is a very complicated process involving human will, and most of our study must be confined to much simpler cases, although in the end we will include even such complicated motions in our picture. The simplest and most completely studied case is that of the motions of celestial bodies. Since we shall find that a study of these will give valuable clues for our interpretation of other motions, the writer will first give a description of these motions and of the properties of space which can be derived from them. We shall then find

that these properties can be visualized by attributing to space a nearly uniform general structure. Close to atoms we shall also find that space has a fine-structure, and in living cells we shall meet with a fine-structure which may even be independent of matter.

When we determine motions, not by the use of measuring rods but by optical instruments, the following elements enter into our description. There is a moving body, there is an optical instrument—which in special cases may be the unaided eye, there is a space between the observer and the observed object and between several observed objects, there is a clock, and there is a light beam, or its equivalent, a stream of moving photons.

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