

Abstract Submitted
for the SES05 Meeting of
The American Physical Society

Teaching the Significance of Angular Momentum Selection Rules in Atomic Spectroscopy R. SETH SMITH, Francis Marion University — In physics and chemistry, angular momentum is a crucial concept that is necessary for understanding the structure and behavior of atoms, molecules, nuclei, and elementary particles. One of the goals of the Francis Marion University Modern Physics Laboratory is to teach students the importance of angular momentum in understanding atomic spectroscopy. Early in the term, our students perform an atomic spectroscopy experiment with Hydrogen and study its energy level structure in depth. Later in the term, they are asked to perform a second atomic spectroscopy experiment with Helium. As with Hydrogen, the spectrum of Helium can be shown to be consistent with the energy level model. However, due to the presence of the extra electron, the Helium spectrum is considerably more complex. In fact, in order to accurately explain it, one must consider the effects of angular momentum. In this experiment, students learn that it is impossible to explain the observed spectrum of Helium without introducing the concepts of angular momentum and angular momentum selection rules. In this way, they come to appreciate the importance of angular momentum in understanding atomic spectroscopy. This talk will describe the Helium spectroscopy experiment. Sample results will be presented.

R. Seth Smith
Francis Marion University

Date submitted: 09 Aug 2005

Electronic form version 1.4