Laboratory Astrophysics Needs for Understanding Photoionized Plasmas

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I will describe the Laboratory Astrophysics data needs presented by photoionized plasmas. This class of astronomical sources represents the majority of the emission line objects that are studied by NASA's observatories. Understanding the physical state of the plasma is important since the spectroscopy allows us to measure the luminosity, chemical evolutionary state, and dynamics, of the emitting sources. I have been developing a large scale plasma simulation code (Cloudy) designed to reproduce the conditions and spectra of photoionized emission line sources. This code is in wide-spread use as an aid in understanding the message in space-based spectroscopic observations. I will outline the lab astrophysics data needs presented by the spectroscopy and its modeling, data that will allow the spectral information to be fully harvested.