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Astronomical Spectroscopy

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Spectroscopy is one of the most important tools that an astronomer has for studying the universe. This chapter begins by discussing the basics, including the different types of optical spectrographs, with extension to the ultraviolet and the near-infrared. Emphasis is given to the fundamentals of how spectrographs are used, and the trade-offs involved in designing an observational experiment. It then covers observing and reduction techniques, noting that some of the standard practices of flat-fielding often actually degrade the quality of the data rather than improve it. Although the focus is on point sources, spatially resolved spectroscopy of extended sources is also briefly discussed. Discussion of differential extinction, the impact of crowding, multi-object techniques, optimal extractions, flat-fielding considerations, and determining radial velocities and velocity dispersions provide the spectroscopist with the fundamentals needed to obtain the best data. Finally the chapter combines the previous material by providing some examples of real-life observing experiences with several typical instruments.

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