

Exploring a Research-Grade Telescope

OBJECTIVES

After completing this exercise the student will be able to:

- state the name and geographical location of selected telescope and observatory.
- identify the configuration and design of the selected telescope.
- provide a brief history of the telescope and observatory's construction.
- provide a brief discussion of a significant astronomical discovery by the telescope applicable to topics covered in lecture.

STUDENT REQUIREMENTS

This activity is to be completed individually by each student. **This activity is meant to substitute the observatory visit requirement**, and all requirements listed in the observatory report student requirements are applicable to this activity. As such, if you simply copy another student's report, it will not count as a completed lab.

INTRODUCTION

Attending an observatory open house, or a special observing session provided by your class, should be one of the most enjoyable experiences you will have in your astronomy course. However, individual schedules and availabilities of each student in addition to the limited amount of on-campus observation sessions (even if moved indoors in case of inclement weather) we can hold can make it difficult for each student to fulfill this requirement. Therefore, this activity is meant to substitute that requirement fully while also giving you a different opportunity to get to know a research-grade telescope and observatory, and what that telescope has done to help further our scientific understanding of our galaxy and the universe.

PROCEDURE

To complete this activity, you must choose a **research-grade telescope** to write about. A long list of suggestions are listed on the next page. Your write-up should:

- 1) Be at least 2 full pages minimum (not including citations), 12 pt font, double spaced, 1-inch margins

- 2) Include the configuration (mirrors, dishes, etc.), design (e.g. materials, size, primary mirror diameter, etc.), and portion of the EM spectrum that the telescope is designed to observe
- 3) Include a brief history of the telescope (e.g. how long did it take to build? What date was first light? Has it been upgraded?)
- 4) Include a brief discussion of a significant astronomical discovery that the telescope has made that falls under topics covered in your 1020 lecture, from stellar astronomy to the universe at large (e.g., the Hubble Space Telescope's observations of the centers of galaxies eventually revealed that all major galaxies host a supermassive black hole in their center. No, you can't use this specific example, but there are other interesting discoveries that are related to this)
- 5) List at least two sources (one for technical aspects, and one for scientific discoveries) in a bibliography page **that will not be counted towards the 2-page minimum requirement**. In-text citations are required, and no, wikipedia is not a valid source.

Below are suggestions for telescopes you can choose. Your choices are not limited to this list. Most of the information about the telescope can be found on each of their own websites.

- Apache Point Observatory (ARC, SDSS)
- Center for High Angular Resolution Astronomy (CHARA)
- Cerro-Tololo Inter-American Observatory (CTIO)
- Kitt Peak National Observatory
- Mauna Kea Observatory
- Gemini North/Gemini South
- Large Binocular Telescope (LBT)
- Subaru Telescope
- Very Large Telescope (VLT)
- Magellan Telescope
- Hubble Space Telescope
- Hipparcos
- Gaia
- Kepler
- Transiting Exoplanet Survey Satellite (TESS)
- Infrared Astronomical Satellite (IRAS)
- Stratospheric Observatory for Infrared Astronomy (SOFIA)
- Spitzer
- Swift Gamma Ray Burst Explorer
- Chandra
- International Ultraviolet Explorer (IUE)
- Galaxy Evolution Explorer (GALEX)
- Cosmic Background Explorer (COBE)
- Arecibo Telescope
- Green Bank Telescope
- Very Large Array (VLA)
- Atacama Large Millimeter Array (ALMA)
- Event Horizon Telescope (EHT)

...and many more!