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The HYADES Mission in the LSST Era

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The origin of Earth's water and its distribution throughout the Solar System remain among the key questions in modern planetary science. The planned Hydrogen and Deuterium Survey (HYADES) space mission will address these questions through highly sensitive observations of water in small Solar System bodies, enabling the detection of even trace amounts of water, as well as measurements of the D/H ratio in water-rich comets to investigate its origin and evolution. LSST is expected to increase the number of known small Solar System bodies by nearly an order of magnitude, significantly expanding the sample of known main-belt comets and increasing the discovery rate of interstellar objects. These discoveries will provide HYADES with a much larger and more diverse pool of potential observational targets, opening new opportunities to search for water in previously unexplored populations. Furthermore, LSST's high sensitivity and regular observing cadence will enable the detection of fainter cometary activity and the monitoring of its evolution over time. Earlier identification of potential targets could be particularly valuable for HYADES, allowing observations to be planned during periods of peak activity and under the most favorable observing conditions. We will discuss the opportunities that LSST will open up for the HYADES mission.

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