

Radio and radar astronomy at the Arecibo Observatory

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In this talk I will give an overview on the radio and radar astronomy research at the Arecibo Observatory. The Arecibo Observatory, located on the island of Puerto Rico, USA, hosts the world's second largest single-dish radio telescope, and the world's most powerful and active planetary radar. I will discuss the findings that can be considered the most significant, or simply the most intriguing during the observatory's 54-year-old history. In radio astronomy, many of these discoveries are related to pulsars, such as the binary pulsar discovered by Hulse and Taylor in 1963, leading to the Nobel Prize in Physics in 1993. Planetary radar brought us the first images of the surface of Venus and Titan, as well as unparalleled images of asteroid and cometary nuclei. Radar astronomy has improved our understanding of the Solar System through observations of the planets and moons up to the distance of Saturn, hundreds of asteroids and a handful of comets, from the determination of the rotation period of Venus to the detection of the first triple asteroid system. Arecibo Observatory's planetary radar system is even this day one of the most powerful ground-based tools for the post-discovery characterization of asteroids and comets, preventing newly discovered objects from getting lost, and increasing vital scientific understanding of the targets' physical and dynamical properties.