

Specjalne Seminarium Astrofizyczne

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Science Capabilities and Opportunities with the Manukoa Spectroscopic Explorer and MSE Pathfinder

Large-scale spectroscopic surveys and facilities have revolutionized astronomy over the past 2 decades. In this talk, I will discuss science capabilities and opportunities with a new instrument at CFHT, the MSE Pathfinder, and a future facility the Manukoa Spectroscopic Explorer (MSE).

The Manukoa Spectroscopic Explorer (MSE) Pathfinder project is a new instrument on the existing 3.6-m Canada-France-Hawaii-Telescope. The MSE Pathfinder baseline will consist of ~1,000 multiplexed fibers available in two modes: MOS using a fiber positioner at prime focus and a IFU mounted at Cassegrain, with a wavelength coverage of 0.36 to 1.0 micron at a moderate resolution ($R \sim 3000-6000$). The MSE Pathfinder with IFU and MOS will enable the exploration of a wide range of science cases including time domain and transients, cosmology, and galaxy characterization and evolution. The MSE-Pathfinder will also provide the spectroscopic data necessary to maximize the science return from a variety of space-based and ground-based facilities.

The Manukoa Spectroscopic Explorer (MSE) is a massively multiplexed spectroscopic survey facility that will replace the Canada-France-Hawaii-Telescope in the late 2030s. This new 12-meter telescope, with 1.5+ square degree field-of-view, will observe 18,000-20,000 astronomical targets in every pointing from 360 nm through H-band ($R=3,000/7,000$) and windows at high ($R=20k-40k$). MSE will enable new discoveries in nearly every field of astrophysics across all spatial scales, from individual stars to the largest scale structures in the Universe, including (i) the ultimate Gaia follow-up facility for understanding the chemistry and dynamics of the Milky Way and Local Group at high spectral resolution, (ii) galaxy formation and evolution at cosmic noon, (iii) derivation of the mass of the neutrino and insights into inflationary physics through a cosmological redshift survey that probes a large volume of the Universe with a high galaxy density. The instrument suite, dedicated to large-scale surveys, will enable MSE to collect a massive amount of data: equivalent to a full SDSS Legacy Survey every several weeks.

Serdecznie zapraszam,

Agnieszka Majczyna