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VISION ON THE NEW TRENDS ON ASTROPHYSICS AND COSMOLOGY: FROM LARGE GROUND BASE SURVEYS TO SPACE MISSIONS

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Since the 20th century, modern astronomy research has bloomed tremendously, thanks, partly and importantly, to various technological developments. For cosmological studies probing the origin and evolution of the Universe, we have observed signals from the baby Universe via the cosmic microwave background radiation, and from the mature large--scale structures through galaxy surveys and lensing observations.

The cosmic expansion history has also been revealed by distance measurements through standardizable candles and rulers. With the abundant information, a concordance cosmological model has emerged, In this model, about 68% of the energy budget is from the dark energy component responsible for driving the cosmic accelerating expansion, ~27% from the dark matter providing enough gravity to form the large-scale structures on time, and only ~5% from the normal baryonic matter.

To understand the nature of dark matter and dark energy is thus one of the most important frontiers in the 21st century. In this lecture, Professor Fan will introduce the development of cosmological studies, our current understanding of the Universe, and future advances and challenges in view of the next generation of large surveys.

Zuhui Fan is now a professor at South-Western Institute for Astronomy Research (SWIFAR) at Yunnan University. She received her Ph.D. in physics in 1995 from University of Washington, U.S.A., and then was a visiting scientist and postdoc at University of Chicago, U.S.A and Taiwan University/ASIAA, respectively. She joined Department of Astronomy, School of Physics at Peking University in 2002, and was a professor there since then. In Nov. 2018, she moved to Yunnan University. Her research field is in cosmology and the formation and evolution of large-scale structures.

Presenter: Prof. FAN, Zuhui (South-Western Institute for Astronomy Research (SWIFAR), Yunnan University, CN.)

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