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### The Skeleton of the Universe

Cosmology has evolved from a speculative field into a precision science using large sky surveys as a laboratory for fundamental physics. From this year, the Euclid satellite and Rubin Observatory will map the distribution of galaxies across most of the sky and 10 billion years of cosmic history. They will identify billions of galaxies, estimate their distances and determine their shapes to test physics on the largest scales.

In this talk, I will take you on a journey through our Universe across the largest scales and the longest times. We will discover the large-scale skeleton of matter behind the cosmic web of structure observed in galaxy surveys. I will explain how our Universe evolved from a nearly uniform initial state into today's cosmos with rich structure from stars to galaxies and beyond. We will see how the tug of war between the gravity of dark matter and the expansion by dark energy is recorded in the cosmic large-scale structure. I will describe how we can squeeze out more information from the largest galaxy surveys by probing cosmic structures beyond the average of standard two-point analyses. This will enable us to put our physical model of the Universe and its ingredients to the ultimate test.

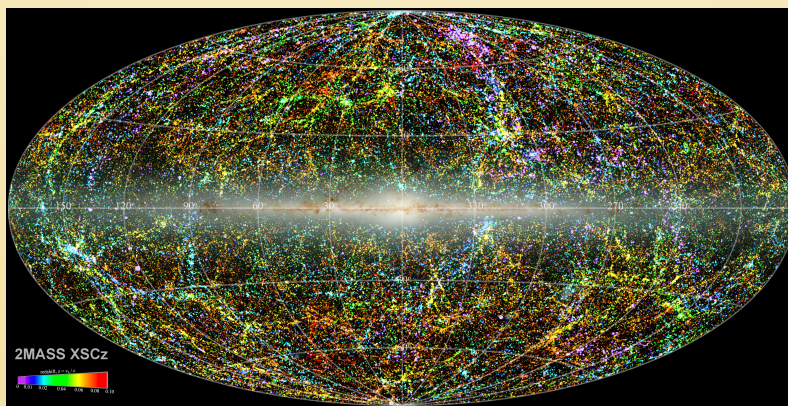


Image: T. Jarrett (IPAC/Caltech), 2MASS extended source catalog (XSC) with additional redshift information (<https://wise2.ipac.caltech.edu/staff/jarrett/2mass/lss/>)

**Tuesday, 28.03.2023, at 16:30 h, HS C (Technik)**

Innsbruck Physics Colloquium,  
Organisation: K. Erath-Dulitz, H.-C. Nägerl, T. Schrabback