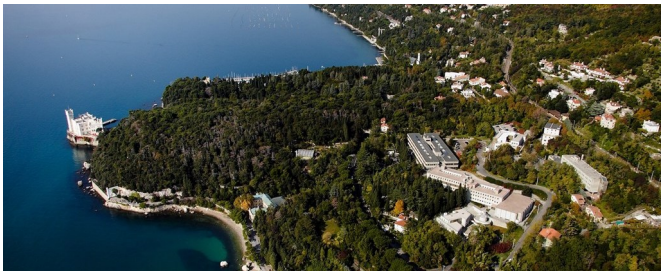

Contribution ID: **150** Type: **not specified**

Fundamental physics using high resolution quasar spectroscopy

Friday 1 September 2023 17:00 (25 minutes)

Observations imply that only 5% of the total energy of the universe is in the form of baryonic matter. The remaining 95% is dark matter (e.g. undiscovered particles) and dark energy (e.g. the cosmological constant, a new scalar field of nature). Ongoing and future research is expected to either reveal the nature of the dark sector or revise our fundamental theories. Astronomical observations probe temporal, spatial and energy scales unavailable in terrestrial experiments and are therefore better suited for this purpose. New, advanced astronomical instrumentation is being built to perform unique tests of fundamental physics, complementary to those made using supernovae, the large scale structure, the Cosmic Microwave Background, and gravitational lensing. I will present how high precision quasar absorption spectroscopy can be used: (1) to probe new physics by searching for variations in the fundamental constants of physics, and (2) to directly measure the temporal redshift evolution (redshift drift) of objects in the cosmic expansion flow. The two projects are also science goals of the Extremely Large Telescope and its ANDES instrument in particular.

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