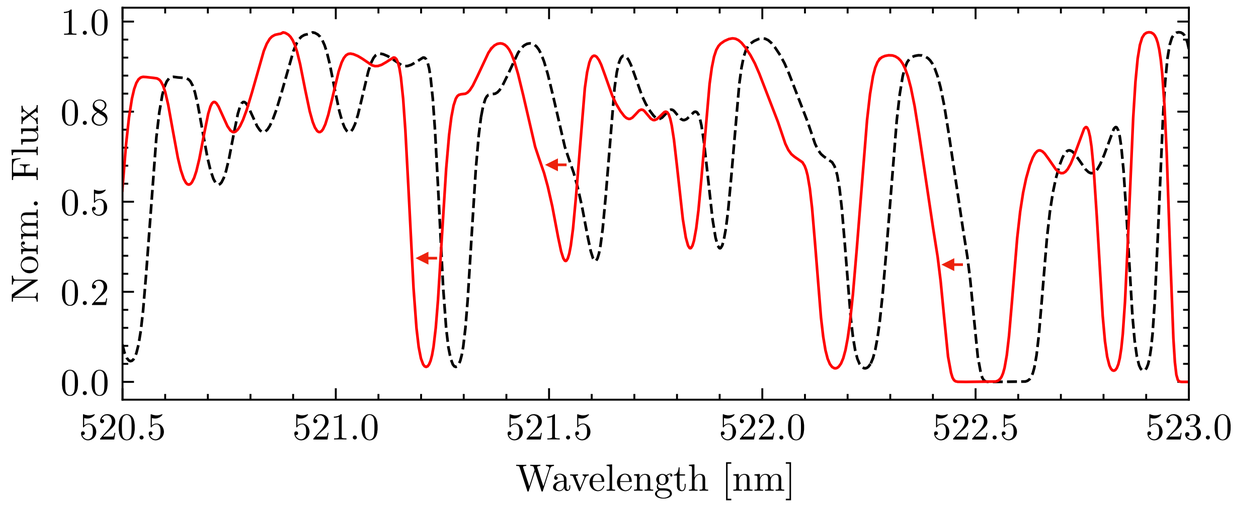
Measuring the Cosmic Redshift Drift with the VLT: A Long-Term ESPRESSO Program into the ELT Era

Andrea Trost (atrost@sissa.it)
and the ESPRESSO WG4

In an accelerated expanding Universe, redshift of fixed objects changes with time

$$\dot{z} = (1+z)H_0 - H(z)$$

$\dot{z}_{z=4} \sim 10^{-11}$ yr^{-1} $\qquad$ $\dot{v}_{z=4} \sim 0.5$ cm s^{-1}yr^{-1}



Direct, real-time, **model-independent** cosmological measurement

Use the Lyman-α forest as a tracer

But the measurement is **EXTREMELY CHALLENGING!**

These two are 8 million years apart…

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Extreme long term *precision*, *accuracy* and *stability* are a must!

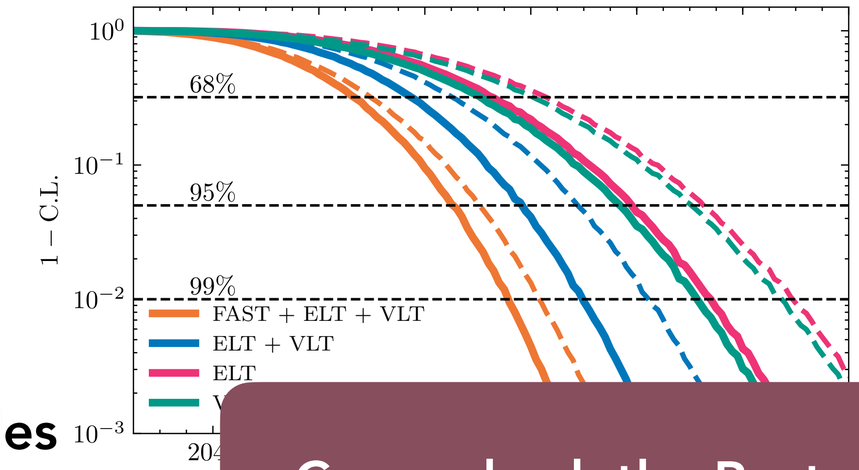
First ever dedicated experiment at high-z

First constraints + study of systematics

Stable Laser Frequency Combs are essential

ESPRESSO is competitive with next-gen facilities

Will lead the Redshift Drift Experiment in the next decades



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