DATA TREATMENT TOWARDS THE ELT AGE: THE ESPRESSO CASE

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SCIENCE / VARYING CONSTANTS

Right Ascension (hours)



Credits: Molaro et al.

SCIENCE / MEASURING THE EXPANSION



SCIENCE / MEASURING THE EXPANSION



Science case		Spectral resolution (λ/Δλ)	Wavel. range (μm)	Wavel. accuracy (m s⁻¹)	Stability (m s ⁻¹)	Multi- plex	Backgr. subtr.	AO / IFU	Polarim.
Fundamental constants & T(CMB)	E	80,000	0.37-0.67	2 (relative)	2 night ⁻¹	none	not critical	no	no
	D	100,000	0.33-0.8	1 (relative)	1 night ⁻¹	none	desirable	no	no
Deuterium abundance	E	50,000	0.37-0.7	50	not critical	none	not crit.	no	no
	D	100,000	0.33-1.0	50	not critical	none	<1% ^a	no	no
Sandage test	E	100,000	0.37-0.67	0.02 (absolute)	0.02 night ⁻¹	none	not critical	no	no
	D	150,000	0.33-0.8	0.01 (absolute)	0.01 night ⁻¹	none	desirable	no	no

ESPRESSO@VLT

D = 8.2-16.4 m R ~ 55k-200k380-780 nm $\Delta v \sim 10$ cm s⁻¹

HIRES@E-ELT

D = 39.3 mR ~ 14k-100k 400-2500 nm $\Delta v = 2 \text{ cm s-1}$

THE ESO DATA FLOW SYSTEM







Lovis et al. 2014

REDUCTION / PIXEL CONSERVATION



Pepe et al. 2013

REDUCTION / PIXEL CONSERVATION



Pepe et al. 2013

REDUCTION & ANALYSIS / RECIPES reduction stellar analysis QSO analysis master bias abs. line fitting stellar parameters master dark stellar continuum QSO continuum gain & bad pixels pixel linearity radial velocity system identification order definition master flat equivalent width common utilities pixel geometry contamination stellar activity indexes coaddition efficiency wavelength calibration mask creation comparison with synth. spectra flux calibration abs. line detection science reduction eq. width from synth. spectra

ANALYSIS / NOT A LINEAR PROCEDURE





execution finished: 67732 ms. Memory: 519680K Free: 161706K (31%)

LINE FIT / CHI SQUARED

