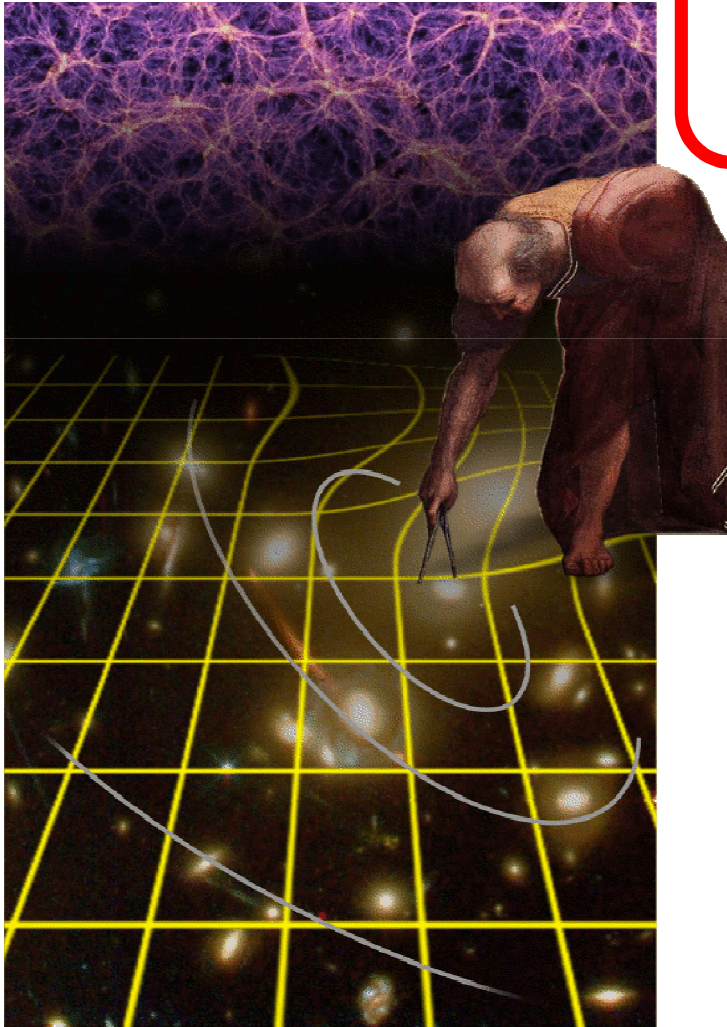


EUCLID

**Alla scoperta della materia e
dell'energia oscura**



Paolo Franzetti

+ Bianca, Marco, Hugo, Luigi

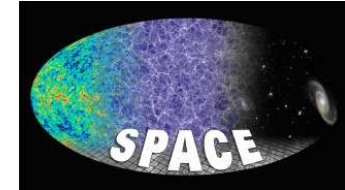
Marzo 2007 Call for Cosmic Vision 2015 – 2025 proposals

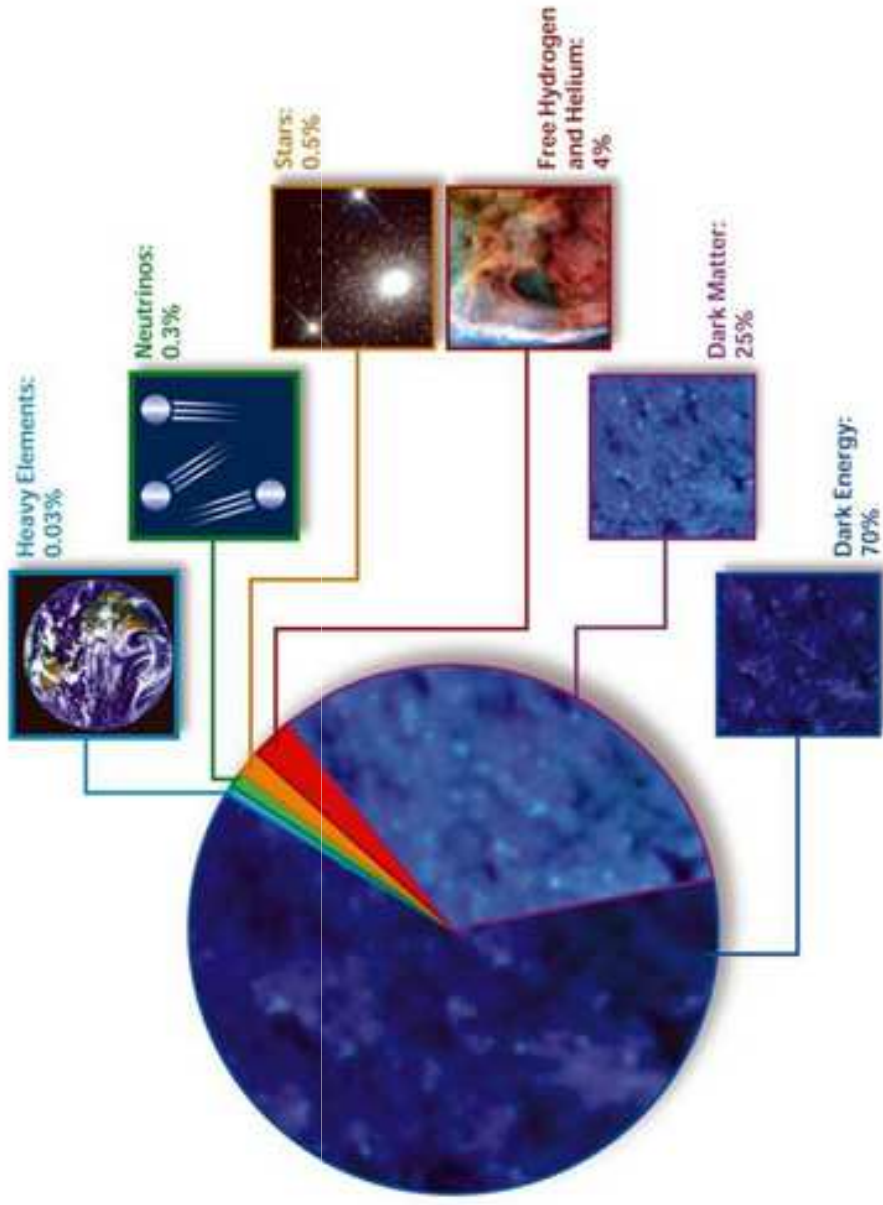
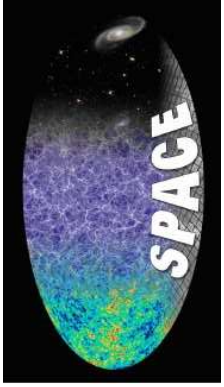
Giugno 2007 Proposal SPACE

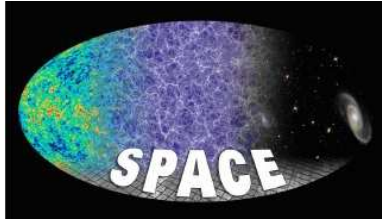
SPectroscopic **A**ll-sky **C**osmic **E**xplorer

PI: Andrea Cimatti (Universita' di Bologna)

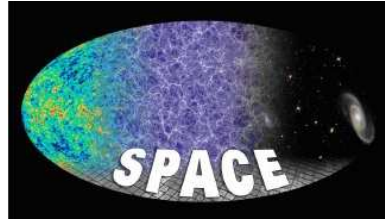
co-PI: Massimo Robberto (STScI, USA)







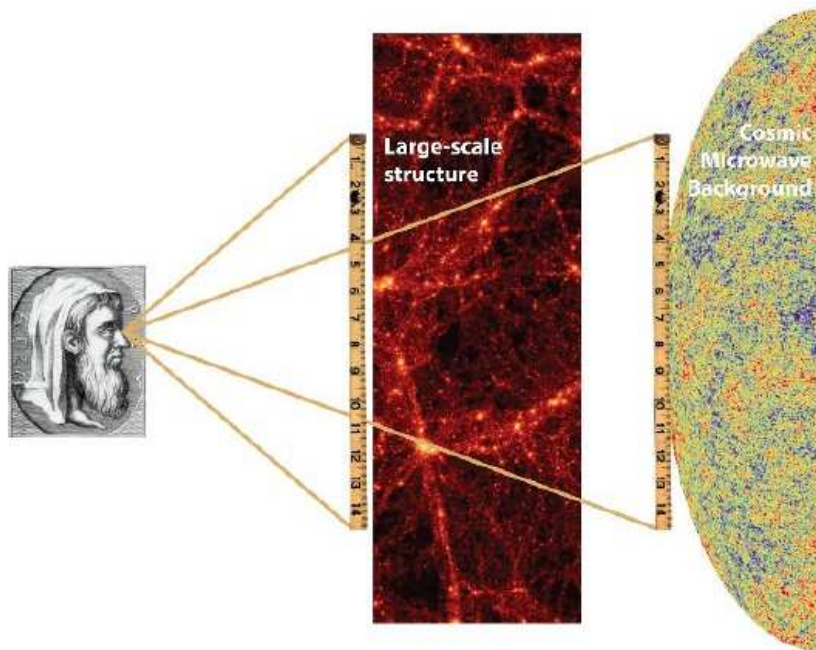
- 1. Is the Dark Energy merely a cosmological constant, as introduced by Einstein, or is it a scalar field that evolves dynamically with the expansion of the universe?**
- 2. Alternatively, is the Dark Energy instead a manifestation of a breakdown of General Relativity on the largest scales?**



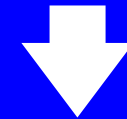
1. **Is the Dark Energy merely a cosmological constant, as introduced by Einstein, or is it a scalar field that evolves dynamically with the expansion of the universe?**
2. **Alternatively, is the Dark Energy instead a manifestation of a breakdown of General Relativity on the largest scales?**

Barionic Acoustic Oscillations

(see <http://cmb.as.arizona.edu/~eisenste/acousticpeak/>)

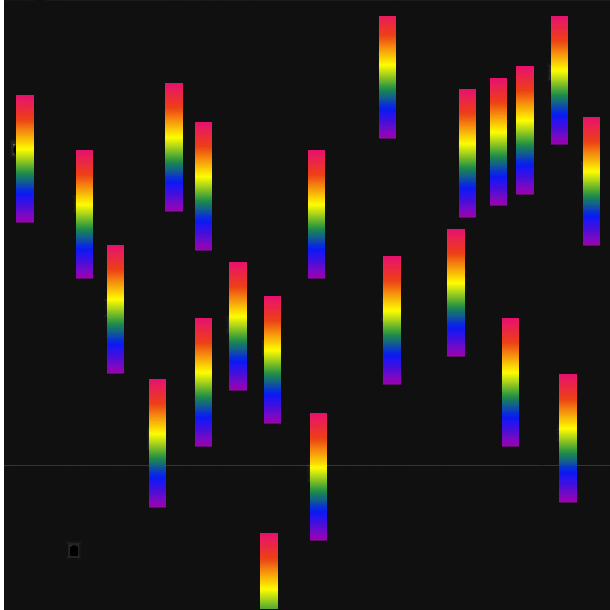


- * **Telescopio di 1.5 metri**
- * **FOV ~ 0.5 sq deg**
- * **L2**

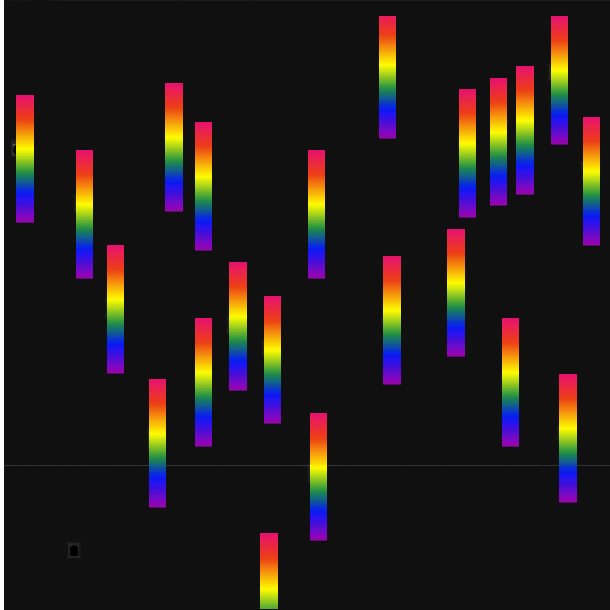


**Mappa 3D dell'universo
su 20000 gradi quadrati e
redshift tra 0 e 2**

MULTI-SLIT



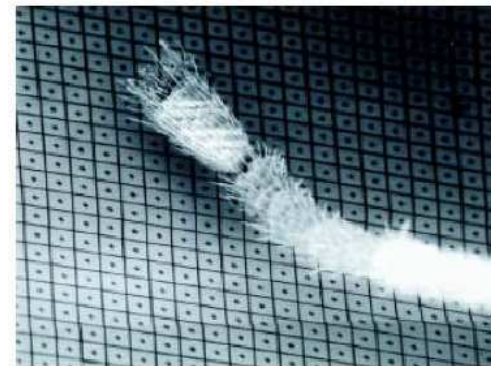
MULTI-SLIT



**Texas Instruments
DMD array (2048x1080)**

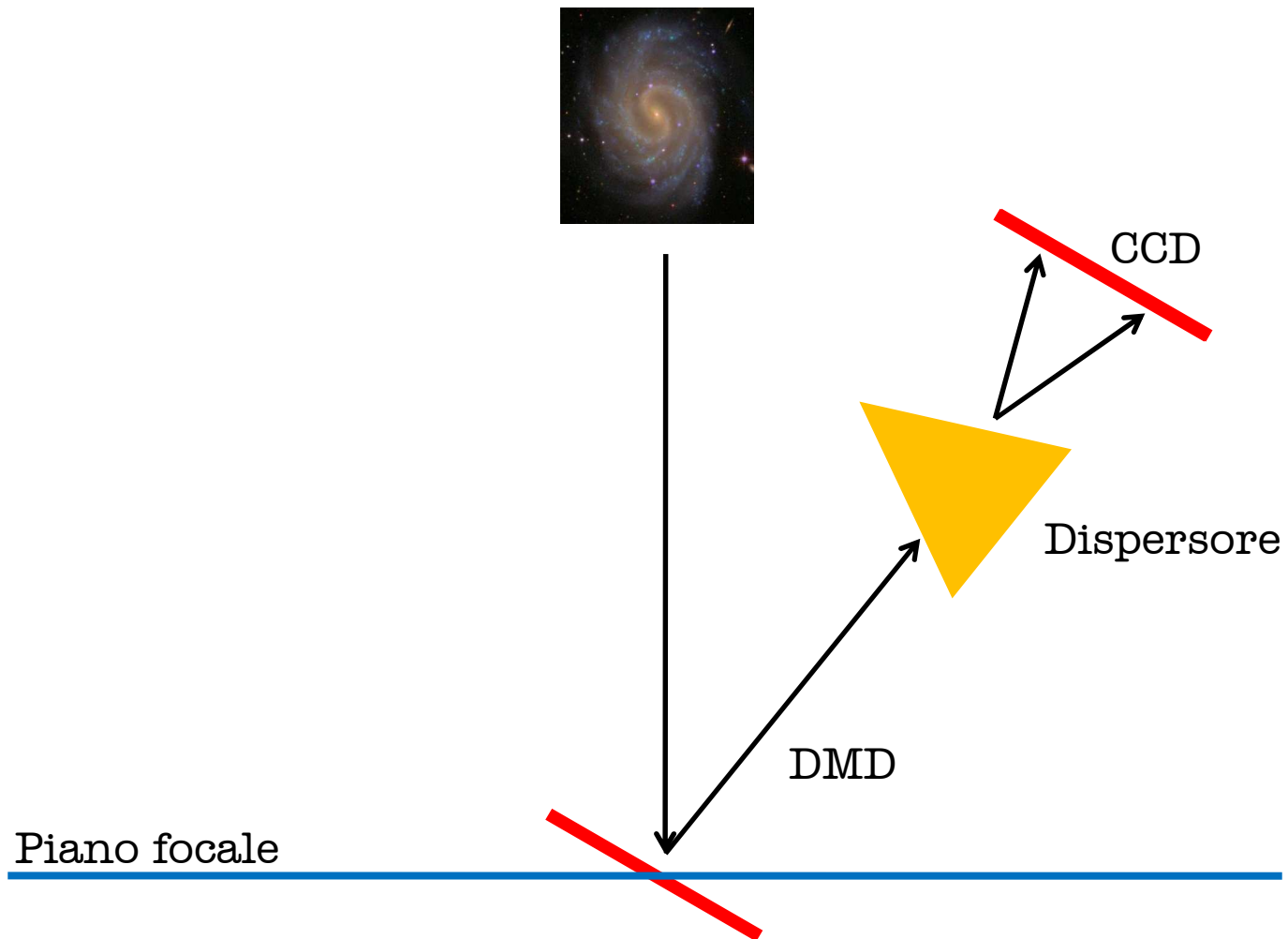
13.8 x 13.8 micron

0.375 x 0.375 arcsec in cielo



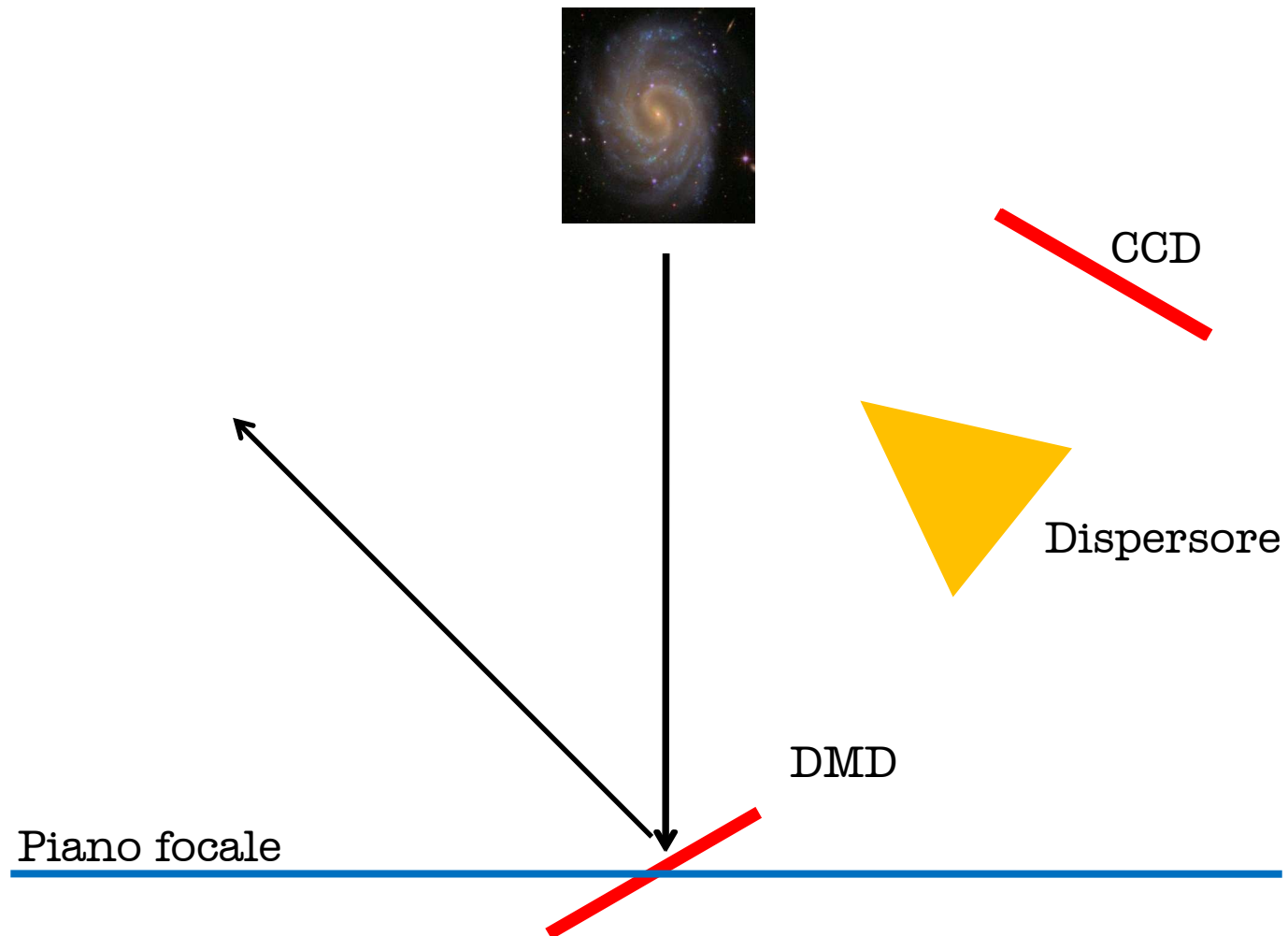
DMD

Digital Micromirror Devices



DMD

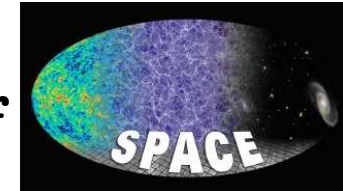
Digital Micromirror Devices



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Giugno 2007 Proposal SPACE

SPECTROSCOPIC ALL-SKY COSMIC EXPLORER



Ottobre 2007 Selezionato da ESA con



Gen. – Mag. 2008 Studio per il merging di SPACE e DUNE

Mag. 2008 SPACE (ENIS) + DUNE (VIS,NIP) = EUCLID

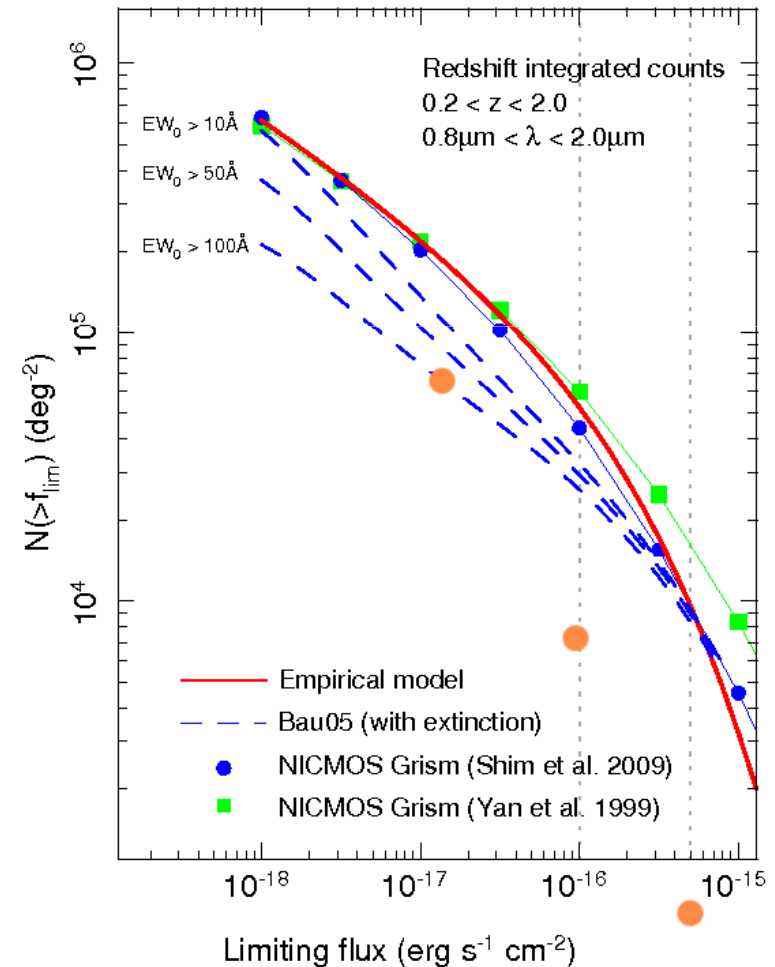
Giu. 2008 – Sep. 2009 EUCLID Fase A

* **Ottobre 2008 - Inizio studio DMD (ESA-LAM-TI)**

* **Primavera 2009 - SPACE + DUNE + JDEM = ???**

UNIVERSE (CATALOG)

- RA, DEC
- Redshift
- Flux and EW for H α line
- Flux and EW for other lines
- Structural parameters (rdisk, rbulge, B/T)
- Apparent magnitudes

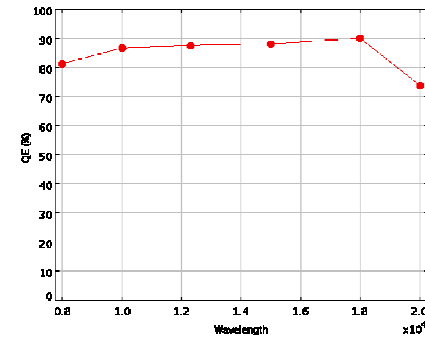
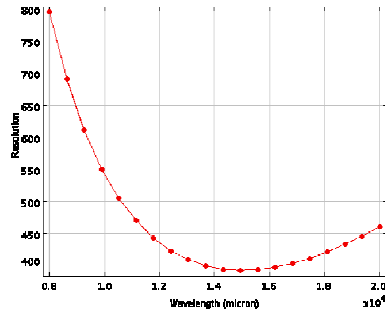
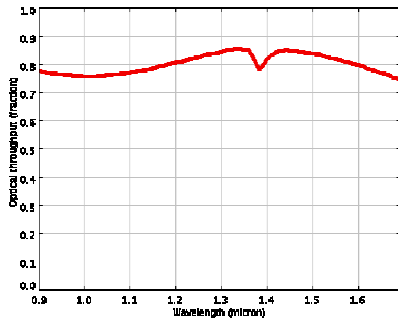


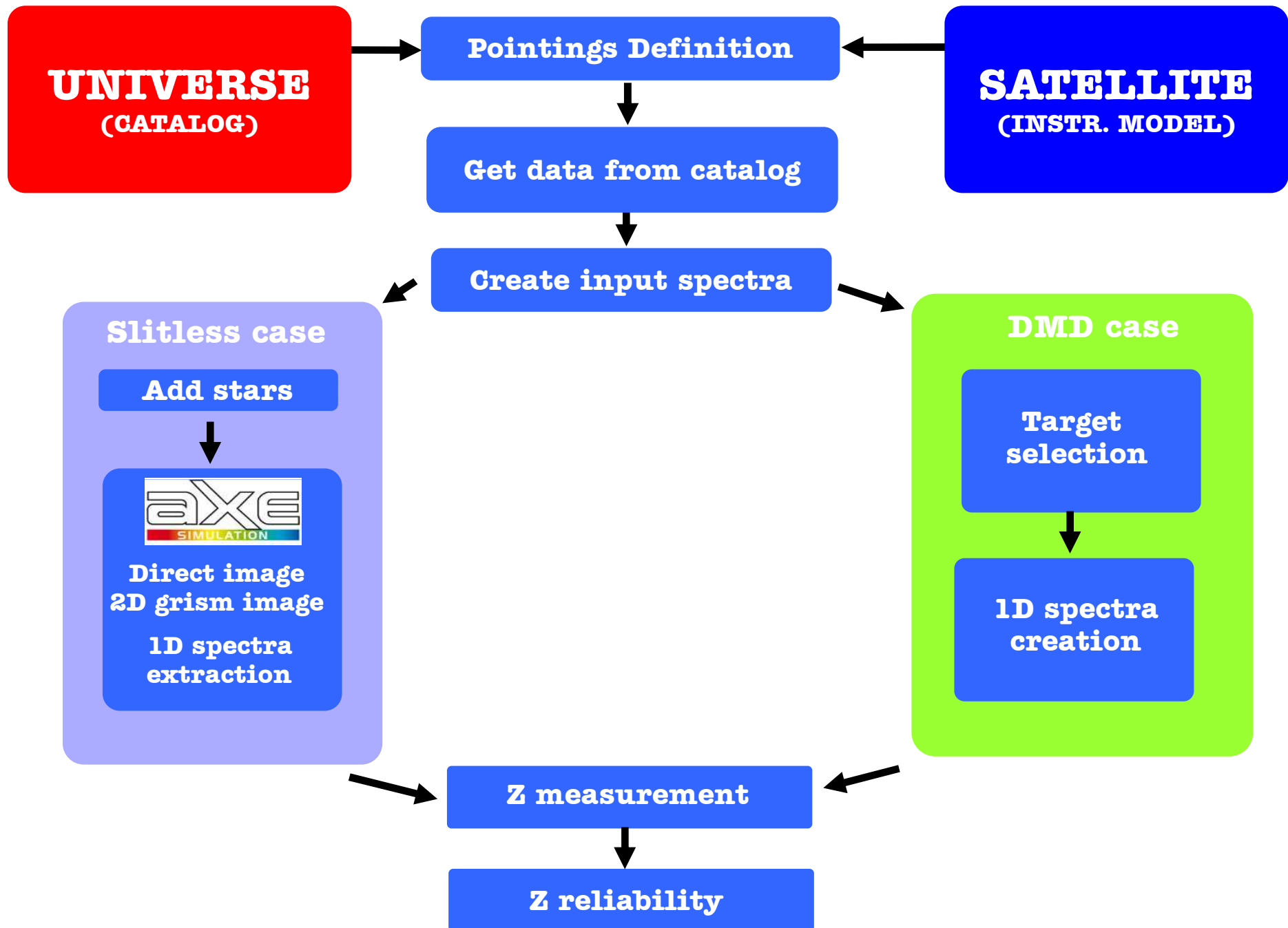
SATELLITE

(INSTR. MODEL)

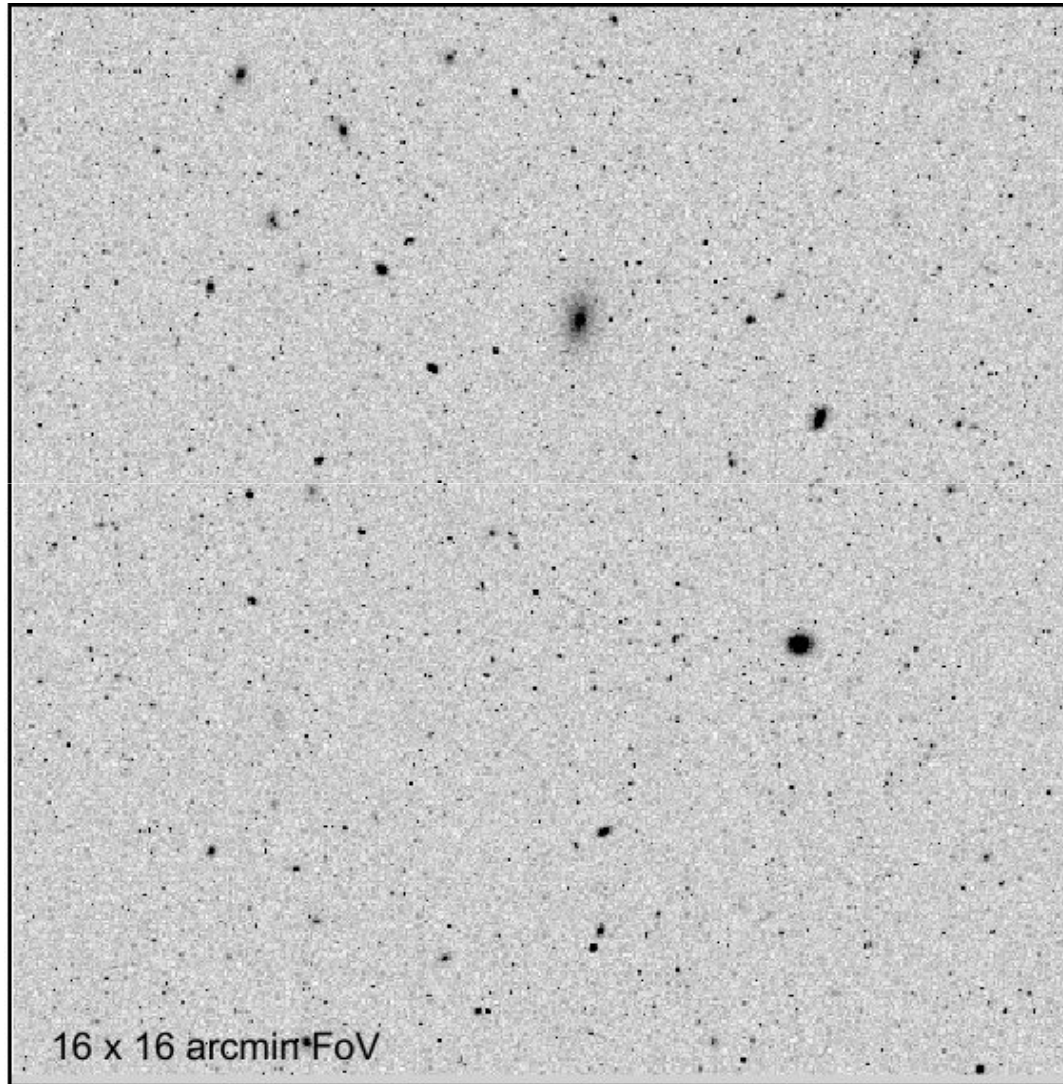
Lambda range
Telescope effective area
Pixel size
Read-out noise
Dark current
Sampling
Disperser
Field of View size in pixels
Integration time
Number of sub-exposures
CCD quantum efficiency
Zodiacal light mode

1.0-2.0 microns
10291.86 cm²
0.45 arcsec
5 el
0.01 el/sec
2 pixels
SF6G05
2048x2048
1800 secs
4
H2RG-C037
ALDERING

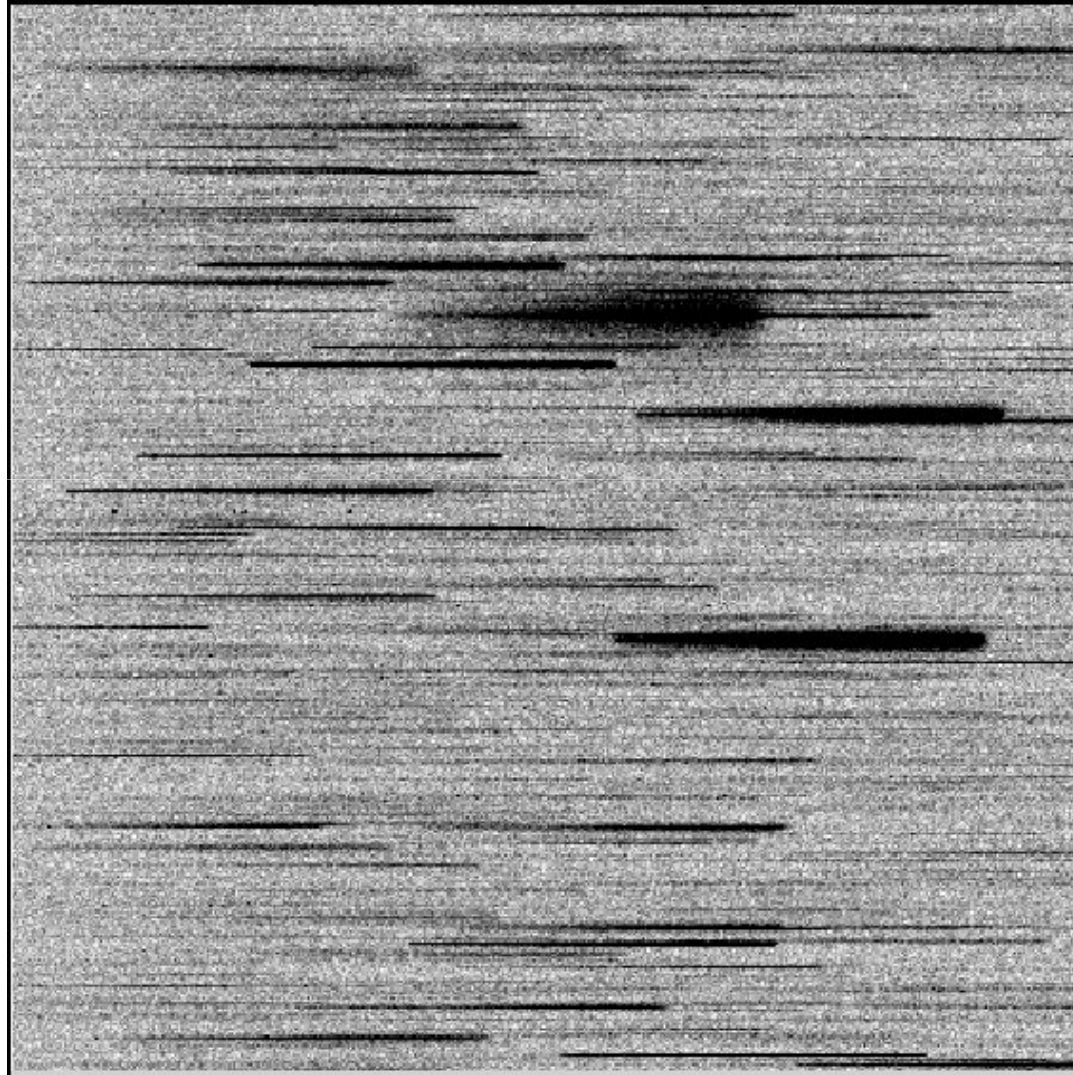




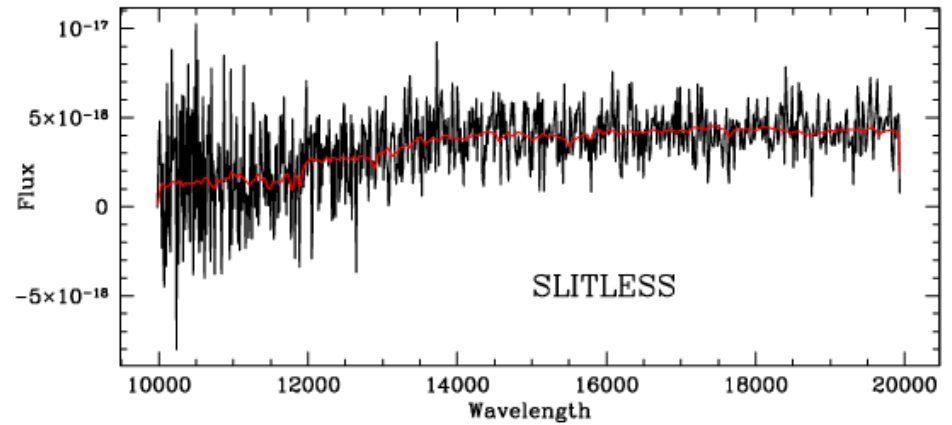
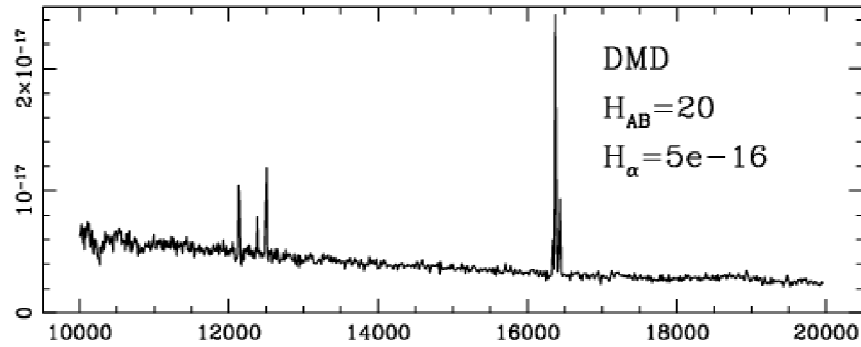
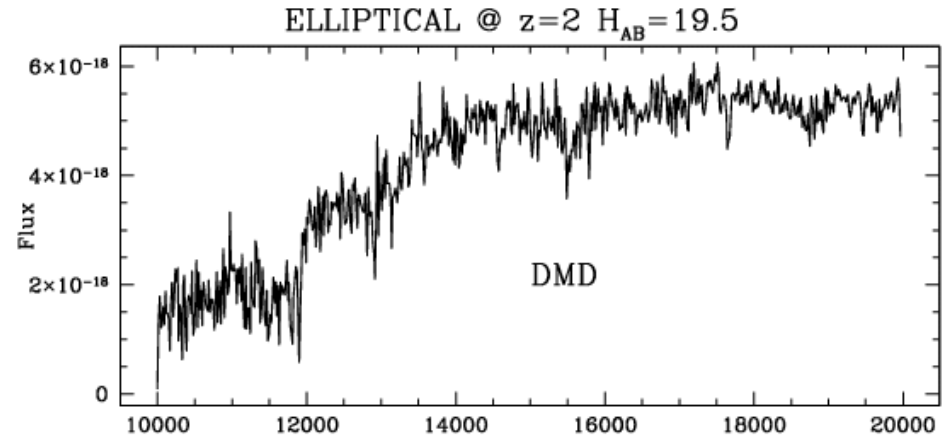
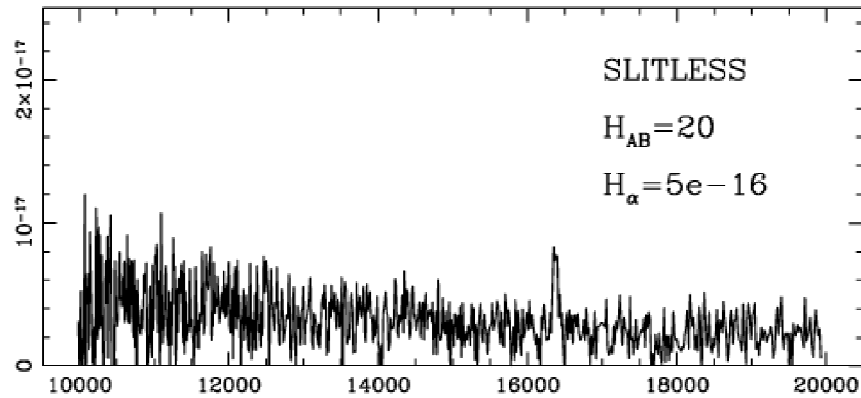
SLITLESS



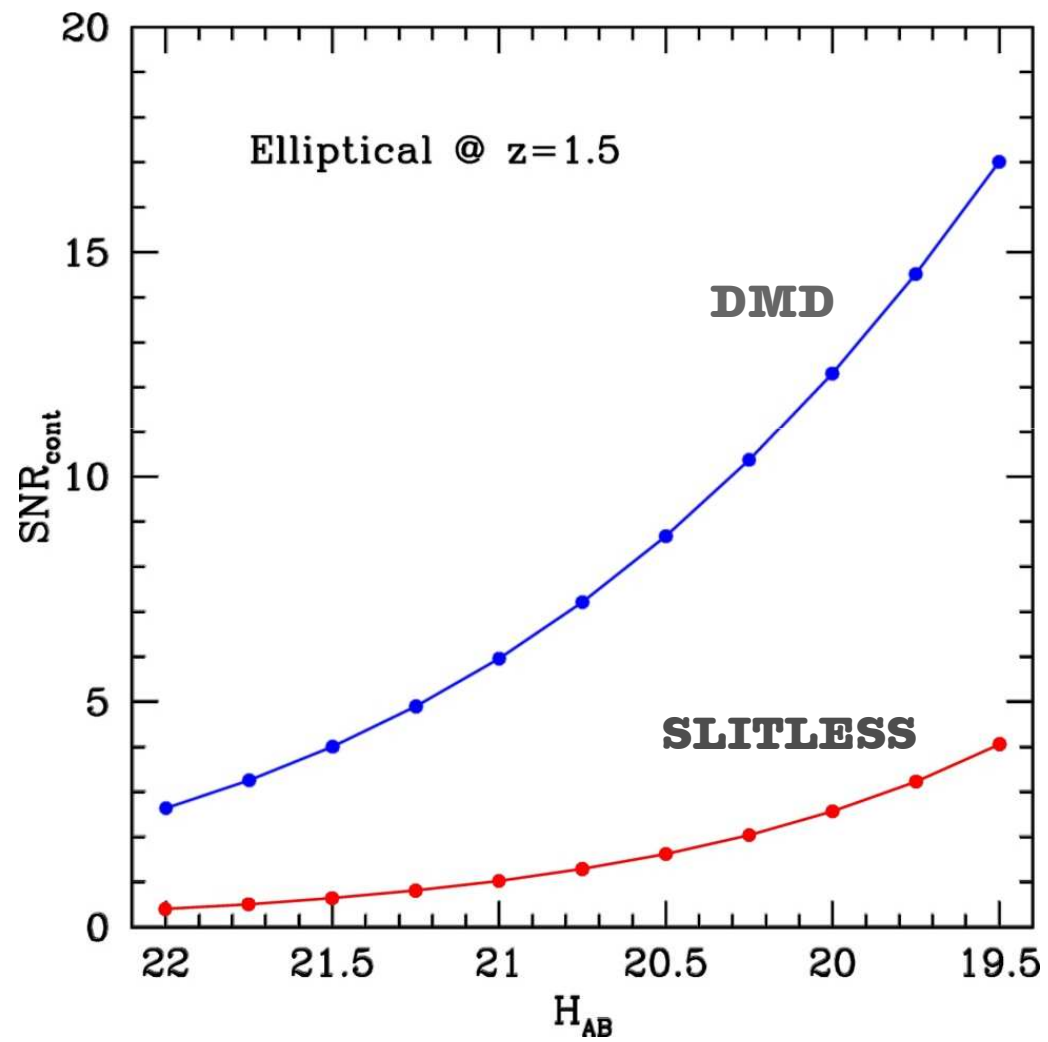
SLITLESS



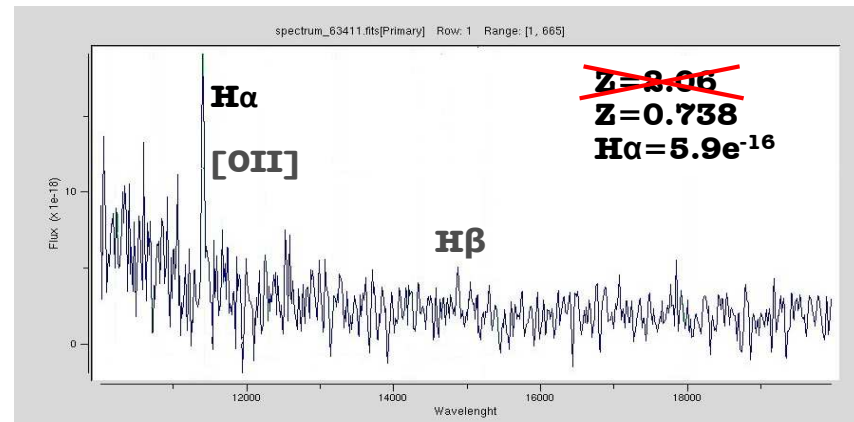
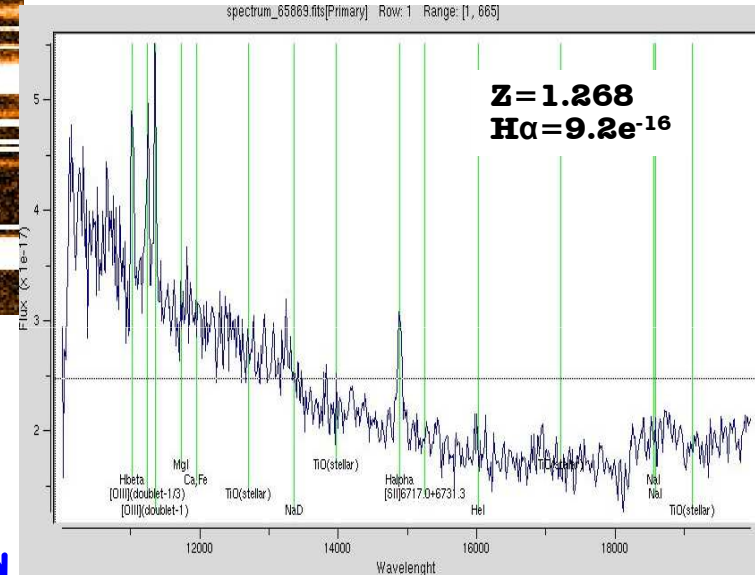
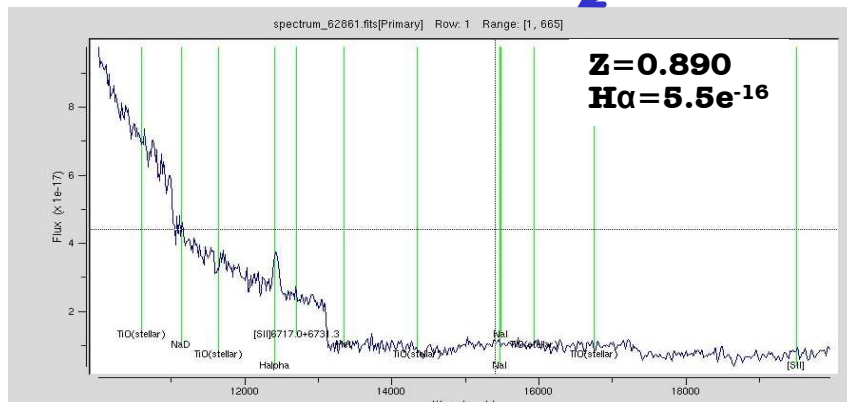
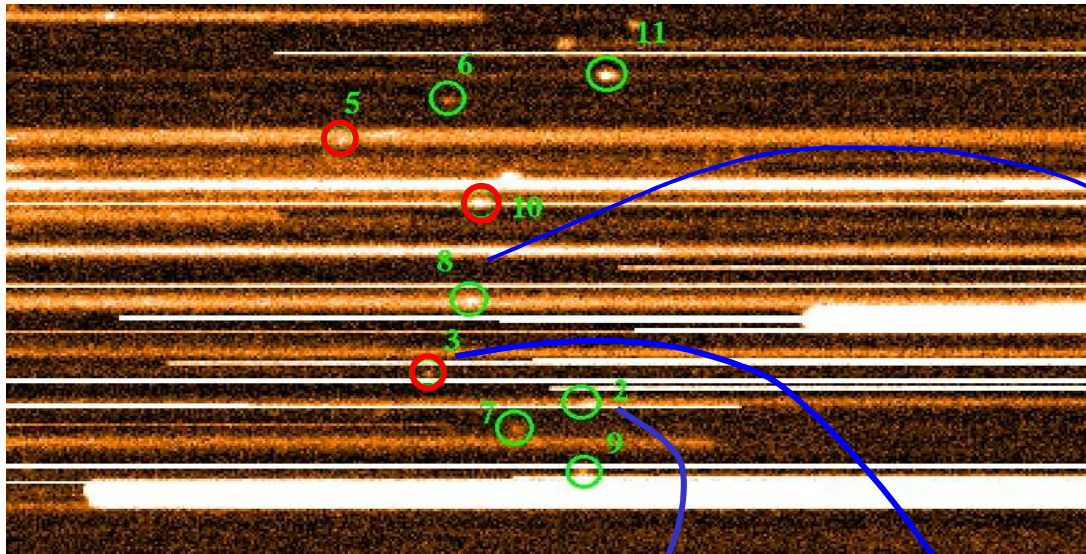
SLITLESS vs DMD



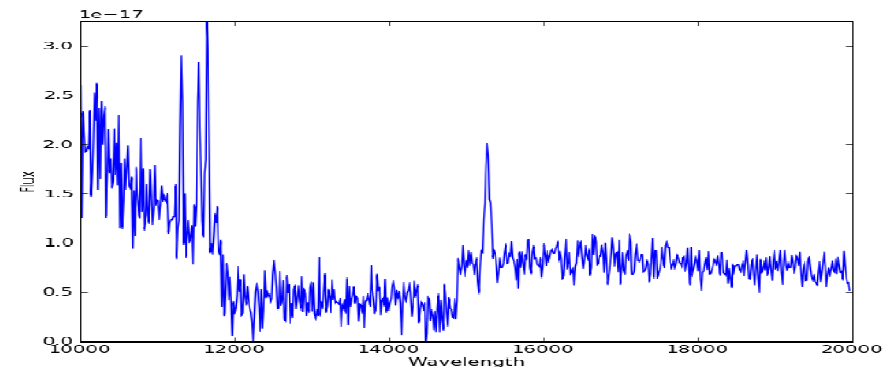
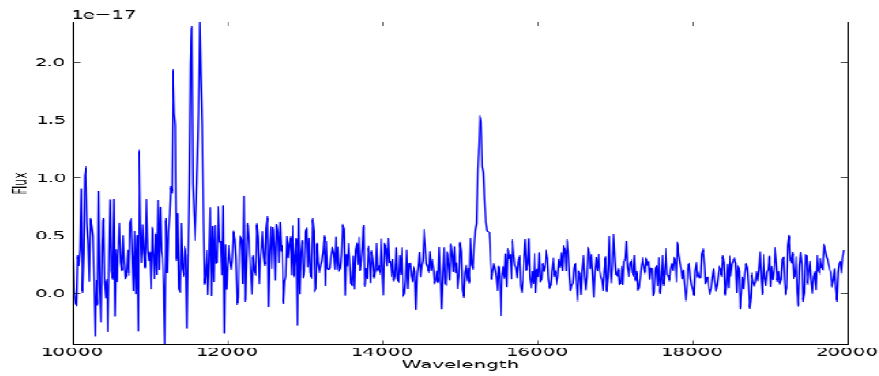
SLITLESS vs DMD



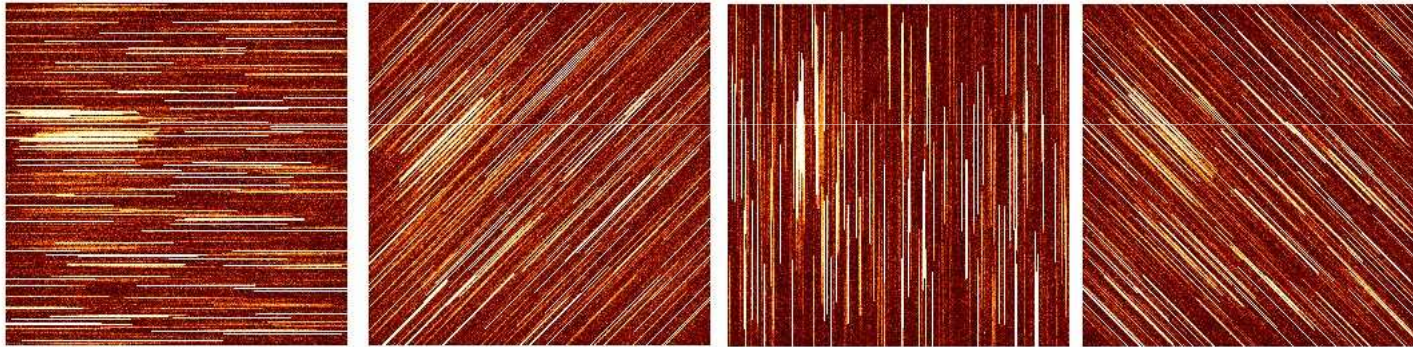
Contaminazione



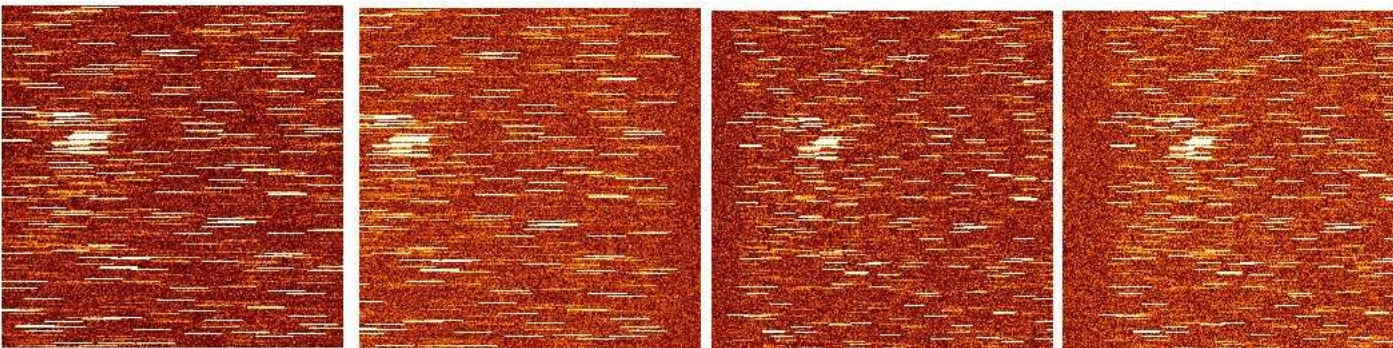
Contaminazione



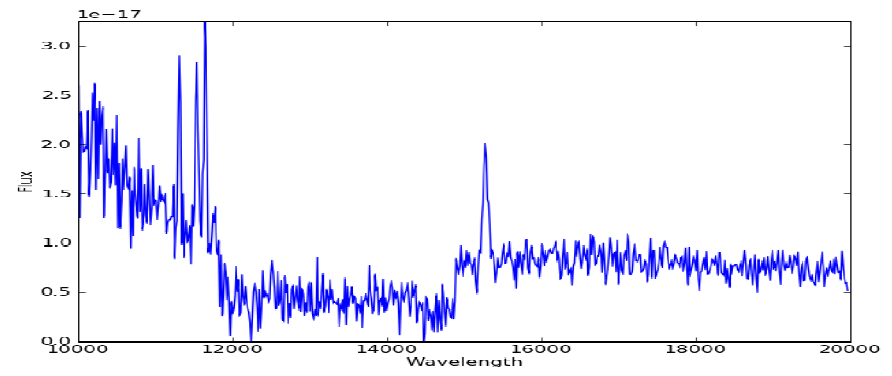
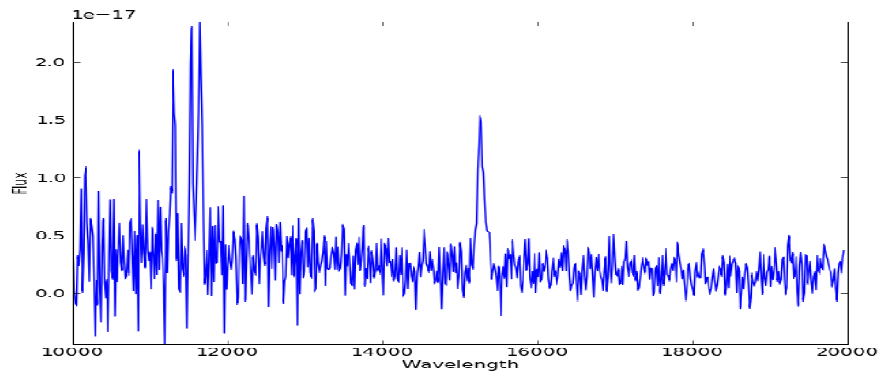
Multiple roll-angles



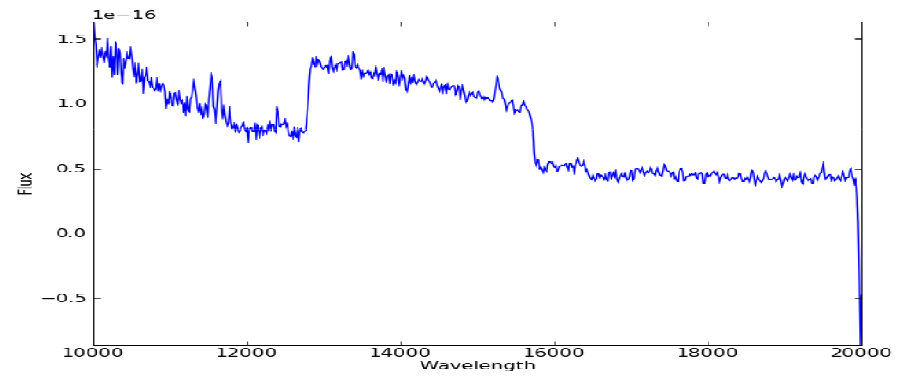
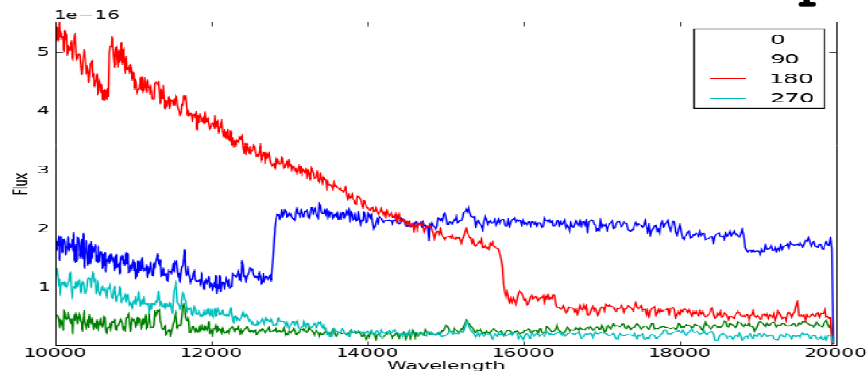
Multiple filters



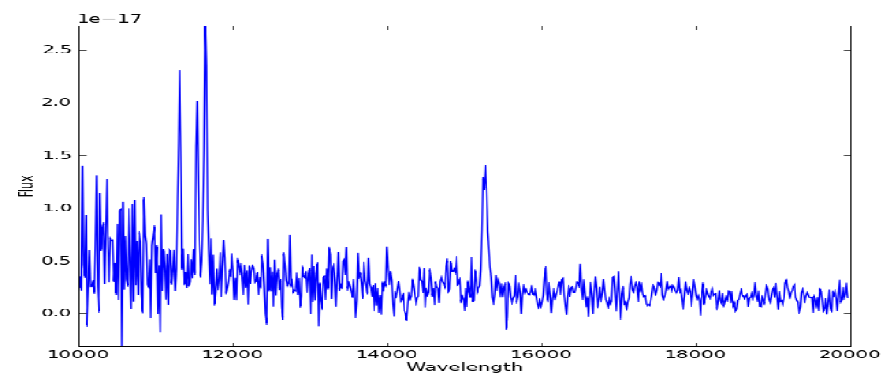
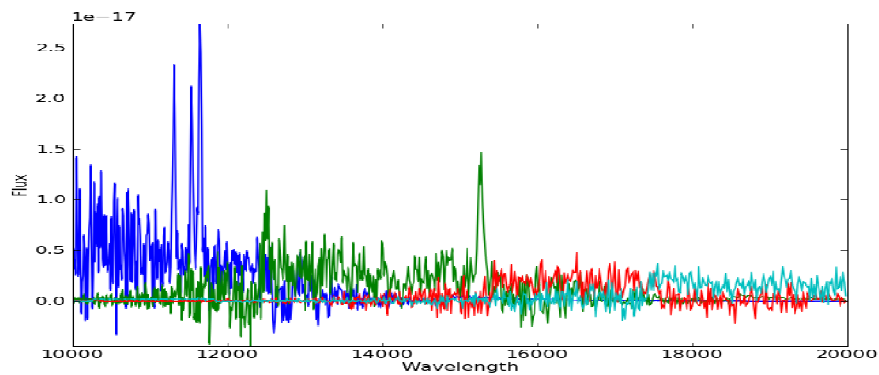
Contaminazione



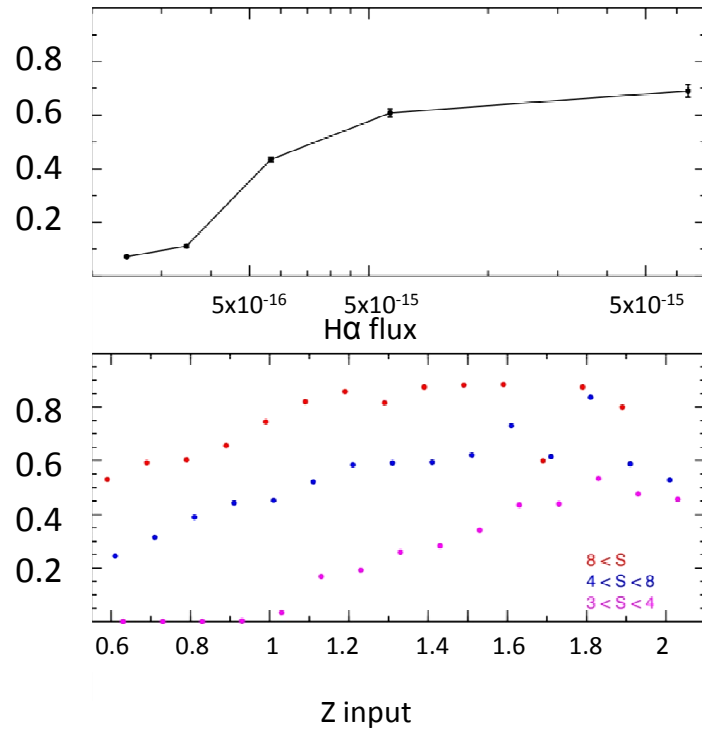
Multiple roll-angles



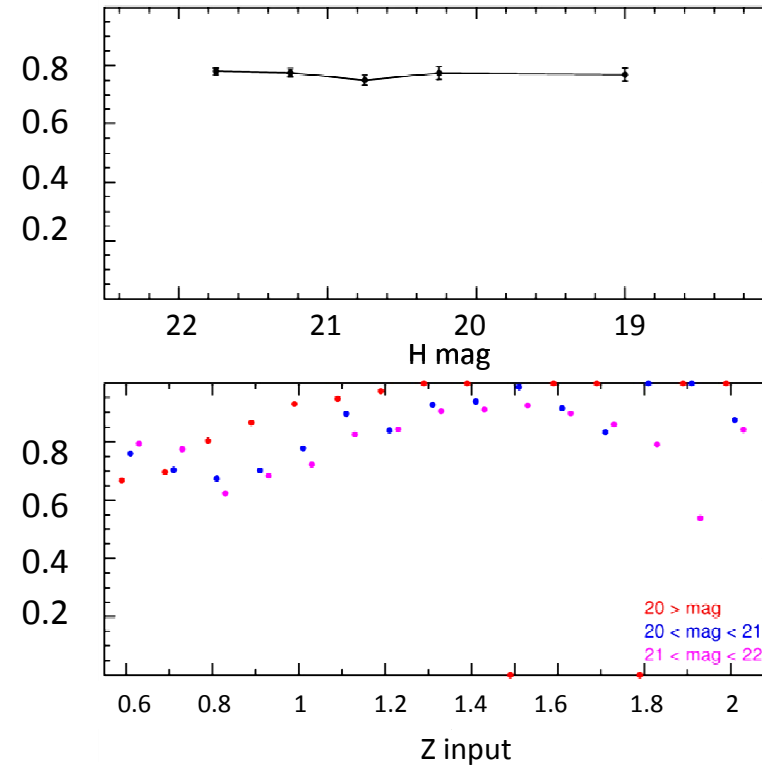
Multiple filters



Slitless success rate (reliable redshifts)



DMD success rate (reliable redshifts)



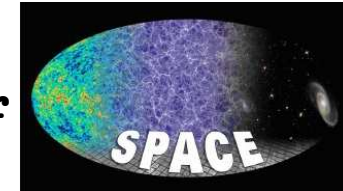
Roll-angles => **success rate + 7%**
Multi-filter => **success rate + 15%**

	SLITLESS	DMD
Survey limit	3e-16 erg/cm²/sec/A	H=22
Explorable z range	0.5-2	0.-2
Target sampling rate	100%	35%
Z success rate	30-60%	80%
Z accuracy	1.e-3	5.e-4
Zyeld/sq deg	~2700	~8400
Total Z	54.000.000	168.000.000

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**Gennaio 2010 Fine tests DMD
Selezione ESA**