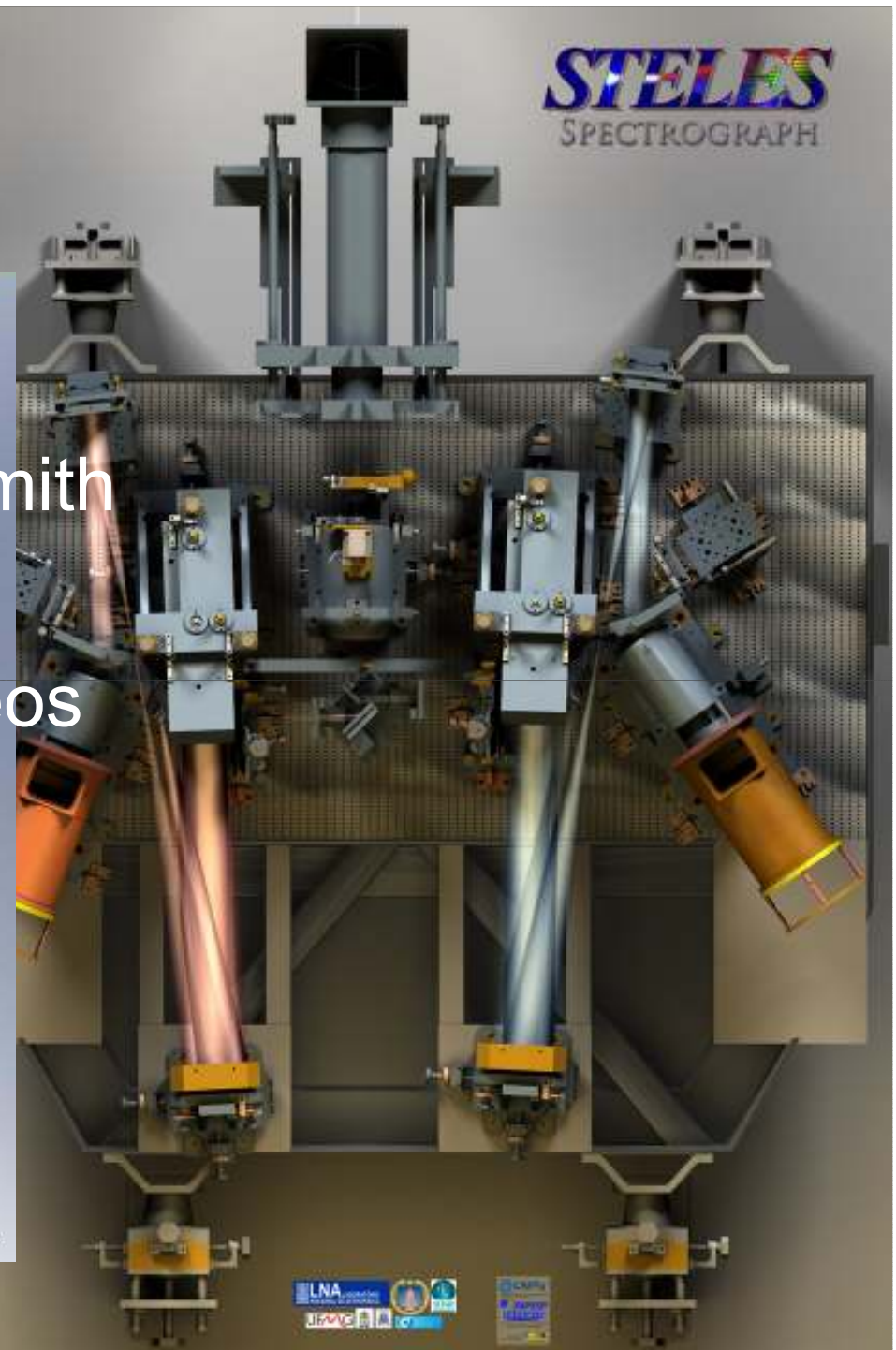


Workshop OPD, SOAR e Gemini

STELES

Características

- Echelle, dois canais
- Alimentação M3 Nasmith
- $R = 50k$ (70k fenda)
- 300-900 nm simultâneos
- Configuração fixa
- 2 CCDs 2x4k
- Pipeline



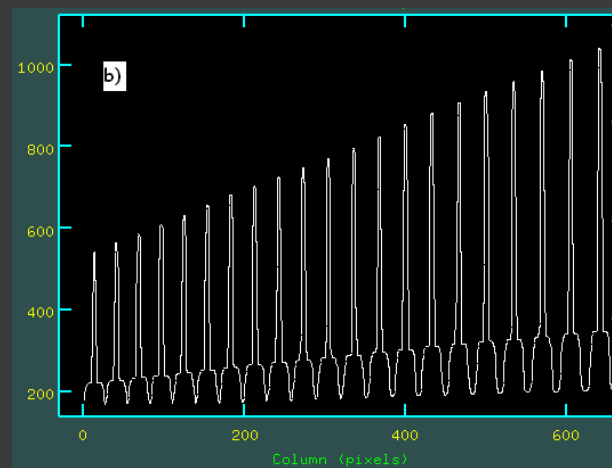
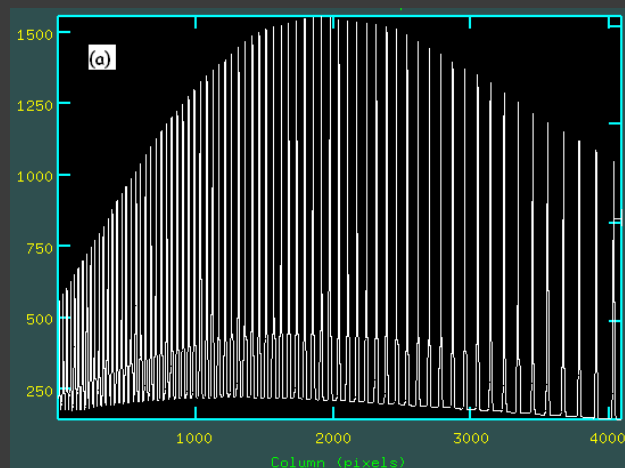
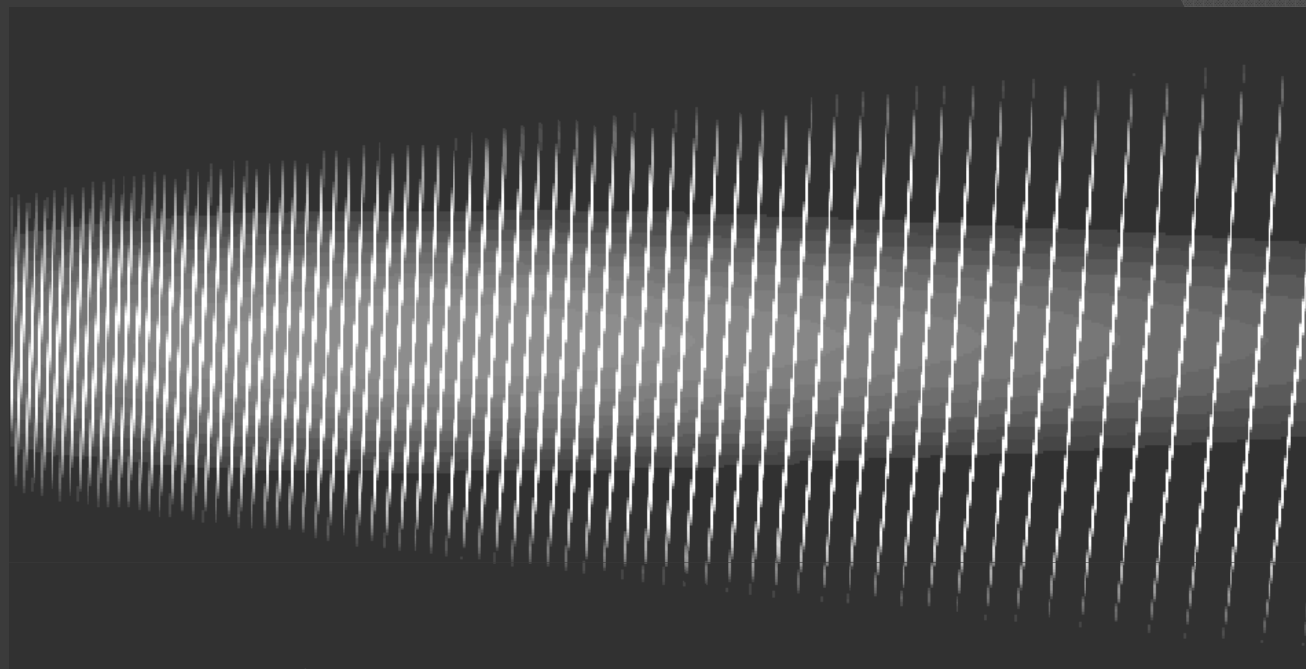
Status

- ⦿ Fabricação ótica iniciada
- ⦿ CCDs – definidos, encomenda marco
- ⦿ Fabricação mecânica iniciada
 - Partes importadas 80% no LNA
- ⦿ Eletrônica e controle em estágio final de definição
- ⦿ Redução de dados – conceito testado
 - Workshop em Abril

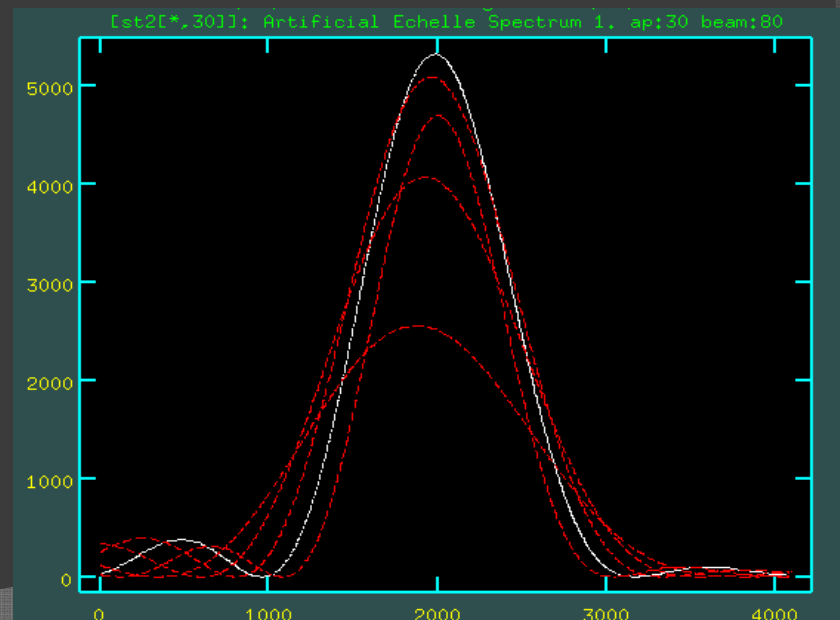
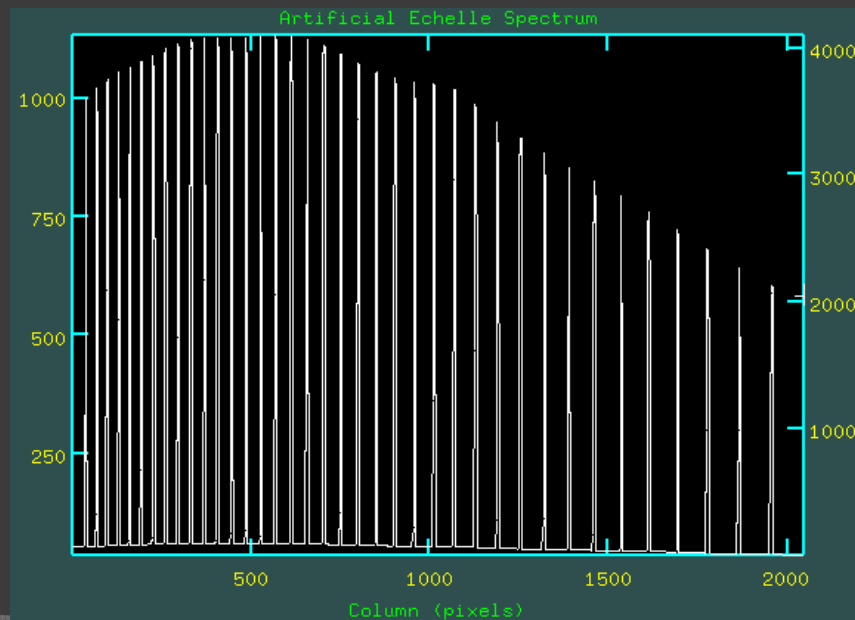
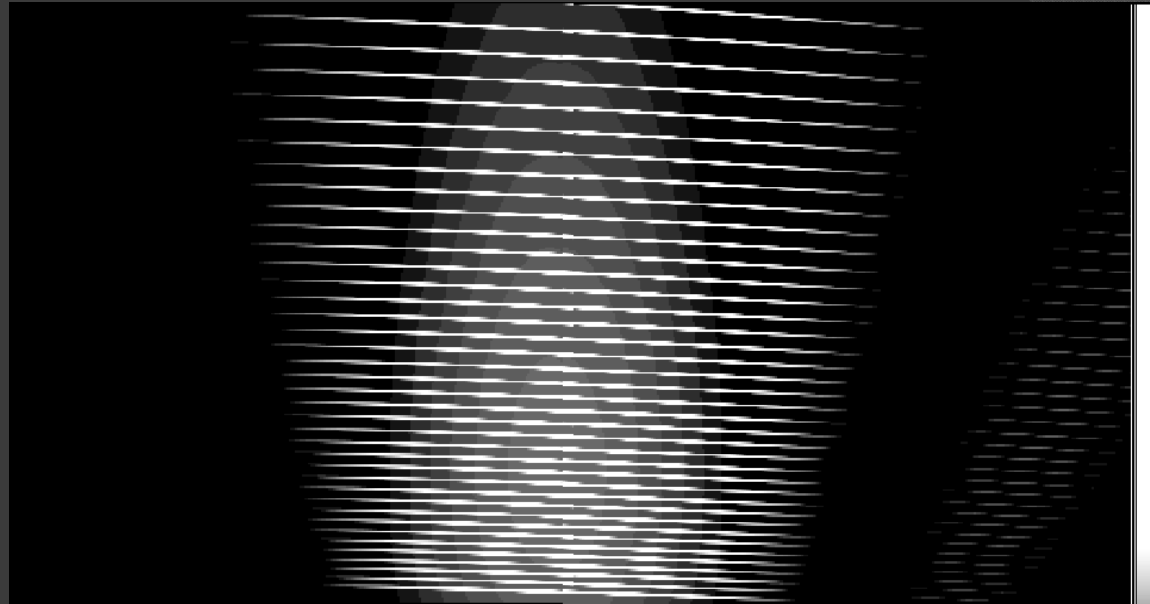
Cronograma

	2010						2011					
	2	4	6	8	10	12	2	4	6	8	10	12
Fabricação da Óptica	4	6	8	10	12							
Fabricação Mecânica	4	6	8	10	12							
Eletrônica		4	6	8	10	12						
Montagem Mecânica / Eletrônica				6	8	10	12					
Montagem Ótica - Alinhamento					8	10	12					
Software de Redução	4	6	8	10	12	14						
Software de Controle	4	6	8	10	12	14						
Testes e Envio						8	10	12				
Comissionamento									6	8		

Blue

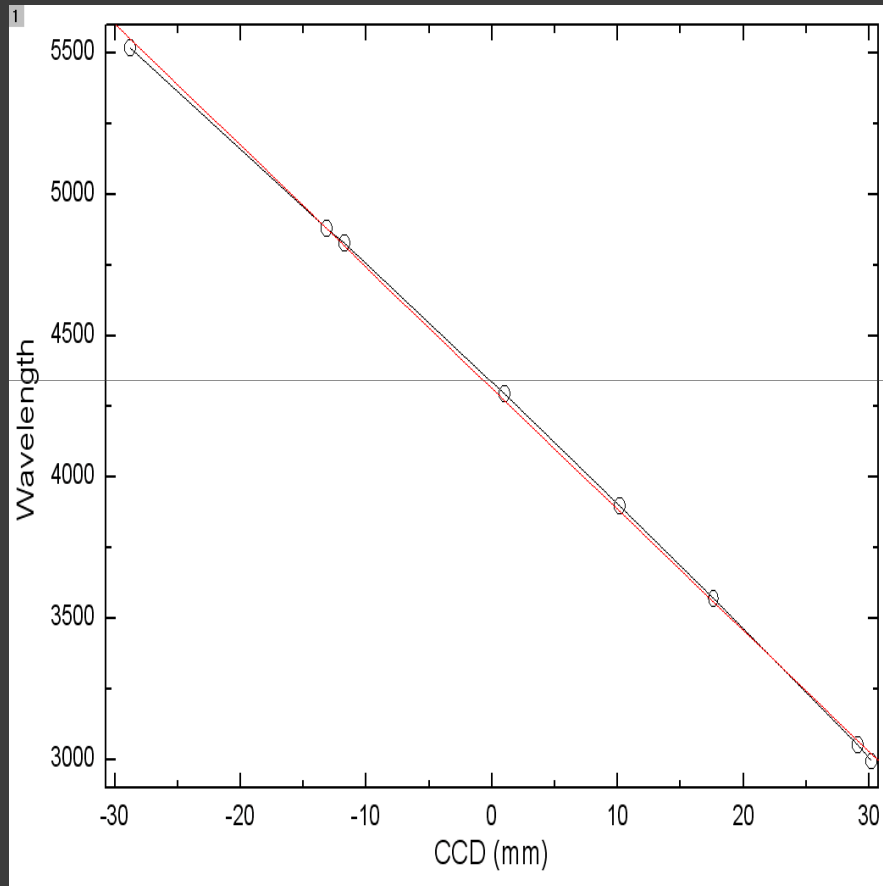


Red

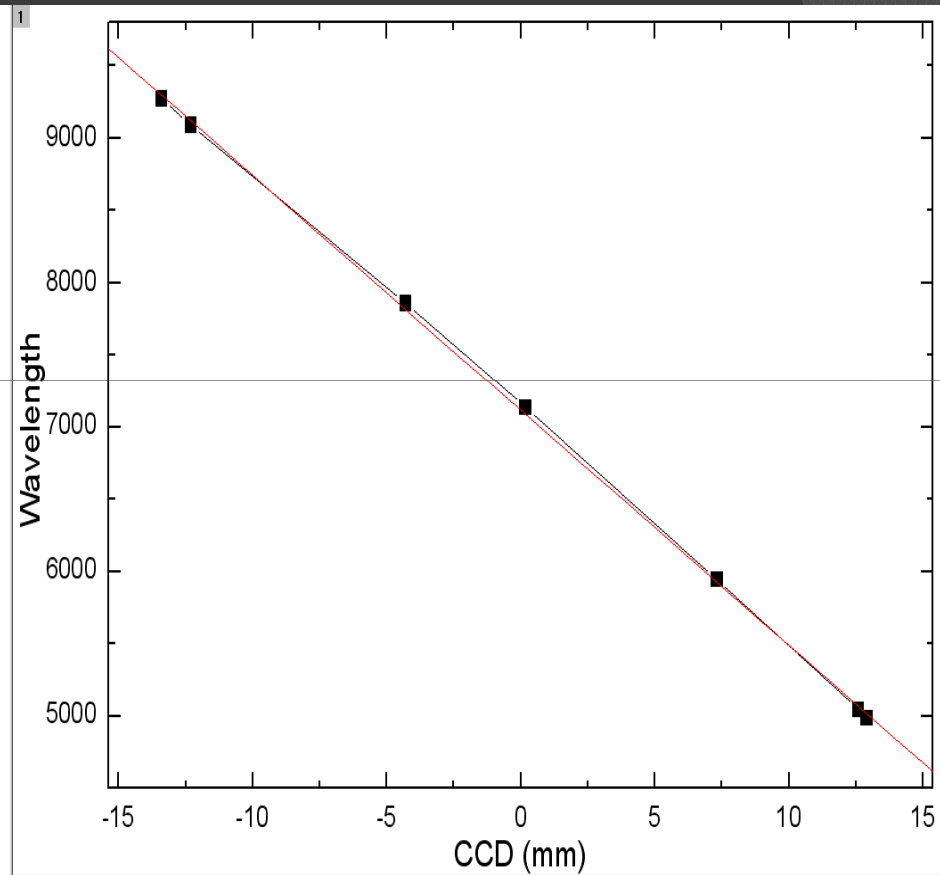


Spectral format / Detectors

Gradient Coating Format



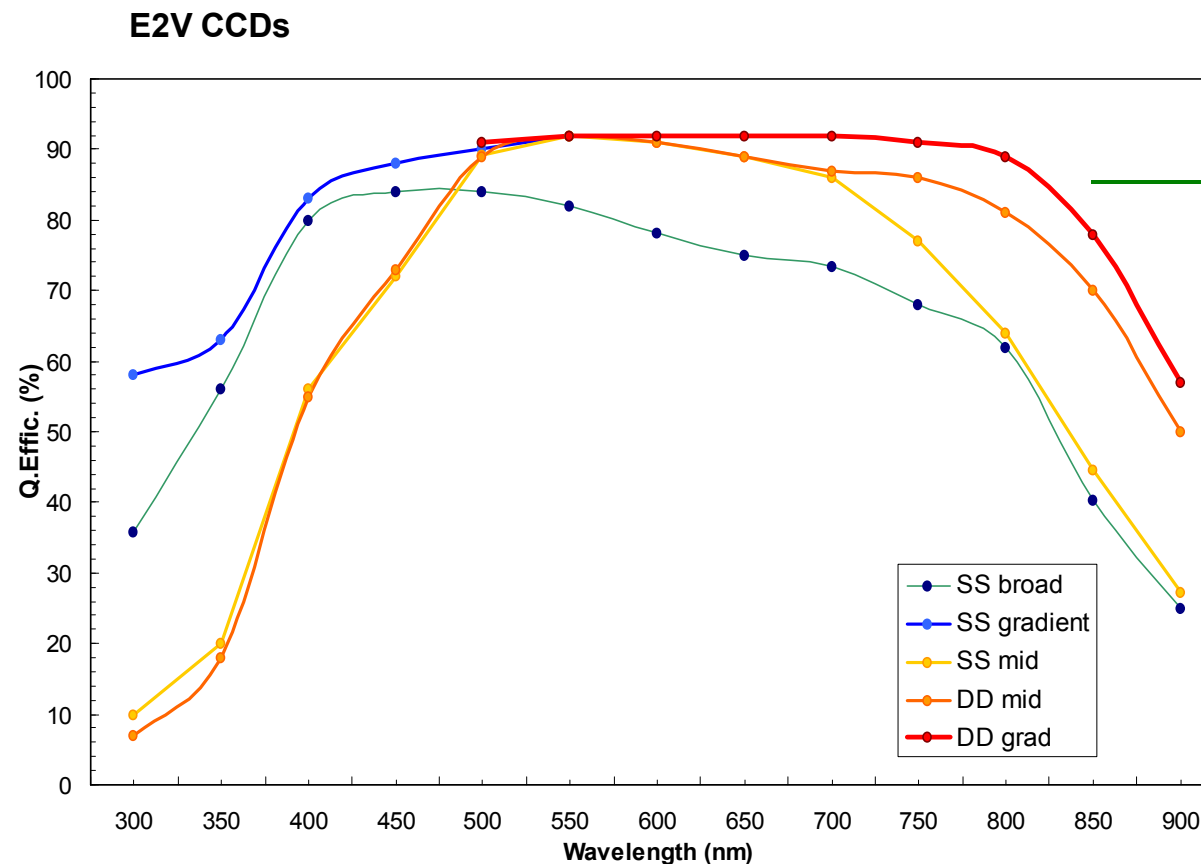
Blue chip



Red chip

Spectral format / Detectors Expected QEf

	E2V 44-82	-100deg			
	SS broad	SS grad	SS mid	DD mid	DD grad
300	36	58	10	7	
350	56	63	20	18	
400	80	83	56	55	
450	84	88	72	73	
500	84	90	89	89	91
550	82	92	92	92	92
	78		91	91	92
	75		89	89	92
	73		86	87	92
	68		77	86	91
	62		64	81	89
	40		45	70	78
	25		27	50	57



Kelt et al. 2005

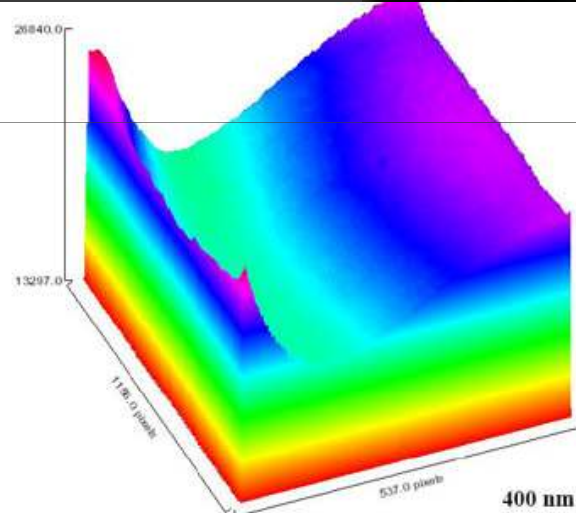
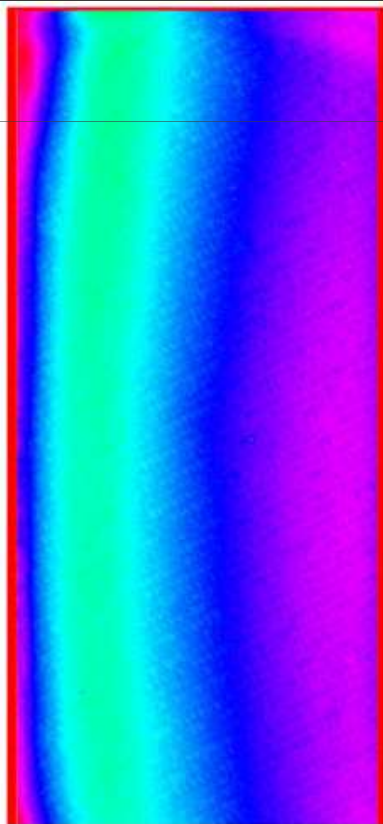
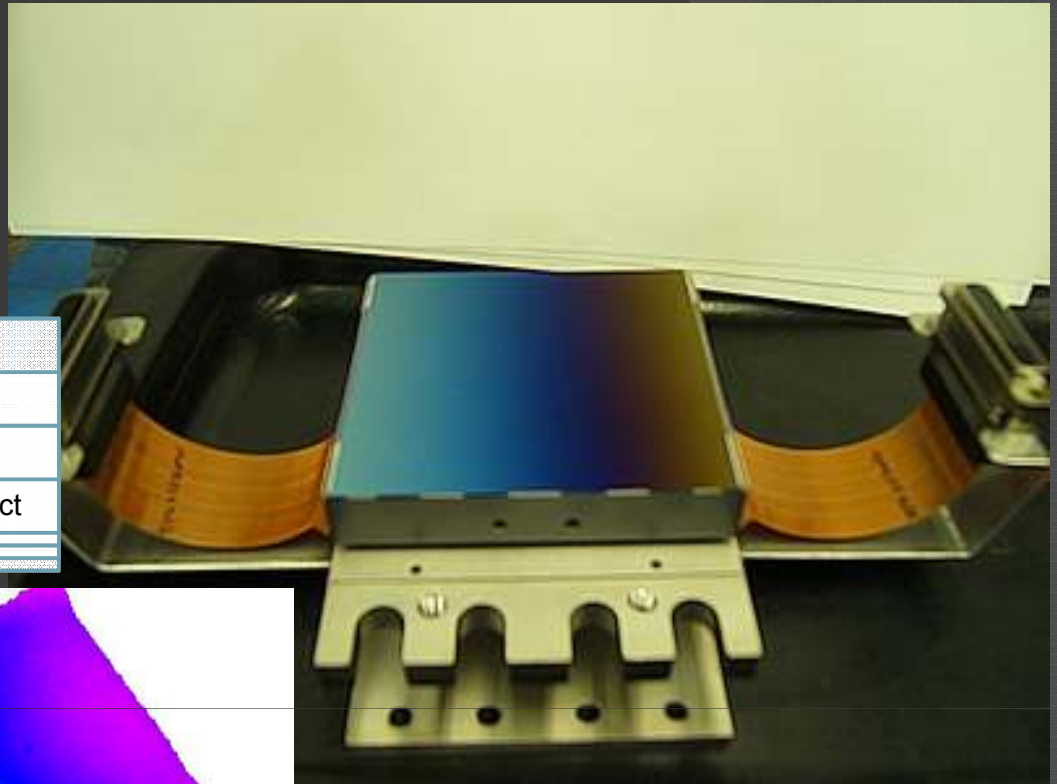
Spectral format / Detectors Results for coating

Other consumers:

CCD42-90 2kX4k5 pixels to Mercator telescope

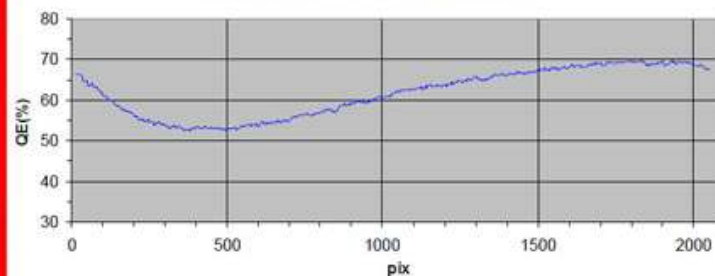
CCD231-84 4k4k pixels to SAO (Harvard)

CCD231-84 set of 25 devices for ESO MUSE project



400 nm

Mercator measured qe profiles across middle row 400 nm



STEELES

Exposure Time Calculator

SOAR Telescope Echelle Spectrograph

[Online help for SPECTIME](#)

Signal-to-noise ratio: Integration time in seconds:

Maximum time per single exposure (seconds):

Central wavelength: From 3600 to 5399 [Å] data is computed for Channel A
From 5400 to 9000 [Å] data is computed for Channel B

Slit width in arcsecs (+) or pixels (-): Dichroic:

Filter:

Detector binning (dispersion):

Seeing (arcsecs): Airmass:

Lunar Phase (0-14 days from new moon, 0 = new, 14 = full):

Describe the source with the following parameters. The power law index is only used if the source spectrum is set to Fx_power or Fv_power. Setting the power law index to 0 is equivalent to a flat spectrum for that particular power law function. If the value of the wavelength of the source flux is set to INDEF then the central wavelength value above is used. The wavelength of the source flux is ignored for source units = U, B, V, R, I.

Source spectrum: Temperature (K) for blackbody source: Power law index:

Wavelength (Å) of source flux or magnitude: Source flux or magnitude: Units of source flux or magnitude:

E(B-V) (reddening of source in magnitudes):

Detector: [Help for Detector Type](#)

sediyama@efe.br

sptime

Object spectrum: Blackbody spectrum of temperature 6000. K
Reference wavelength: 5500. Angstroms
Reference flux: $V = 12$. ($6.03E-14$ ergs/s/cm²/Å)
Sky spectrum: Cerro Pachon
Moon phase: 0
Extinction:
Airmass: 1.
Seeing: 0.8" (FWHM)

Telescope: Slit
Area: 13.2 m², Scale: 3.144 arcsec/mm
Spectrograph: STELES
Collimator:

Focal length = 0.85 m
Apertures: Slit with Gaussian profile
Size: 0.80" x 21.63", 0.254 x 6.88 mm, 4.2 x 100.0 pixels

Filter: Dichroic A
Disperser: Echelle
Central order = 104
Central wavelength = 4500. Angstroms
Central dispersion = 2.66 Angstroms/mm, 0.0399 Angstroms/pixel
Ruling = 41 lines/mm
Blaze = 76.0 deg
Grating tilt = 76.1 degrees
Grating magnification = 0.96
Using predicted efficiencies

Crossdisperser: VPH
Central order = 1
Central wavelength = 4500. Angstroms
Central dispersion = 2.66 Angstroms/mm
Ruling = 1200 lines/mm
Blaze = 14 deg
Grating tilt = 16.2 degrees
Grating magnification = 0.86
Using tabulated efficiencies

Camera:
Focal length = 0.215 m, Resolution = 3. pixels

Detector: MIT/LL
Pixel size: 15 microns, 0.19"
Number of pixels = 2048
Read noise = 0.0 e-, Gain = 1.0 e-/DN, Dark = 0. e-/s

Source pixels: 14 pixels (3xFWHM seeing disk)
Background pixels: 89 pixels

WARNING: Orders overlap

---- Results for 919.61s exposure at 4500. Angstroms ----

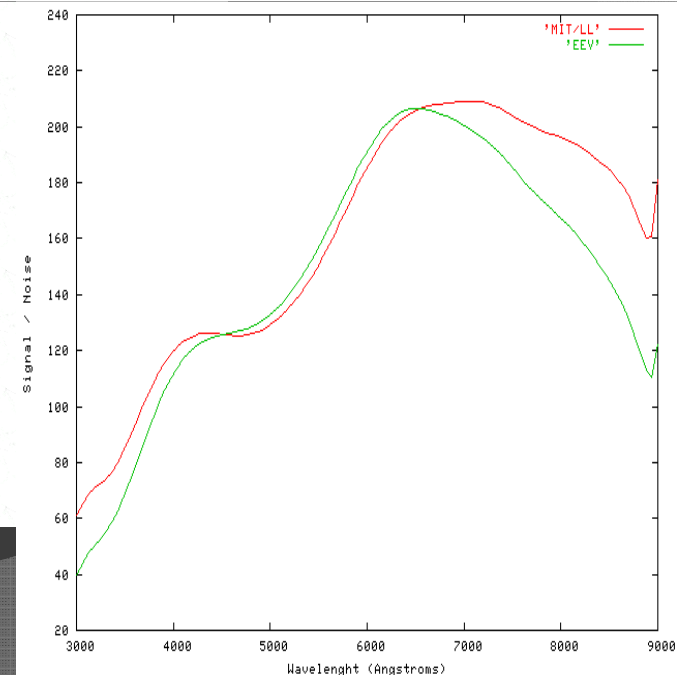
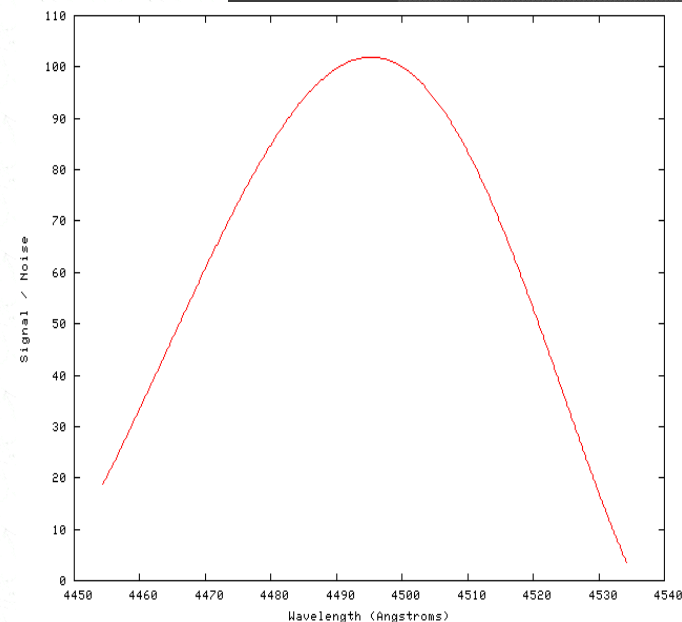
Source flux: 0.0141 photons/s/cm²/Å (AB=12.4)
Background flux: 2.71E-6 photons/s/cm²/Å (over source pixels)

Transmission/Efficiencies:	individual	cumulative
Telescope	75.8%	75.8%
Aperture (seeing=0.8")	62.4%	47.3%
Filter	97.6%	46.2%
Spectrograph	44.3%	20.5%
Disperser	84.2%	17.2%
Detector DQE	87.0%	15.0%

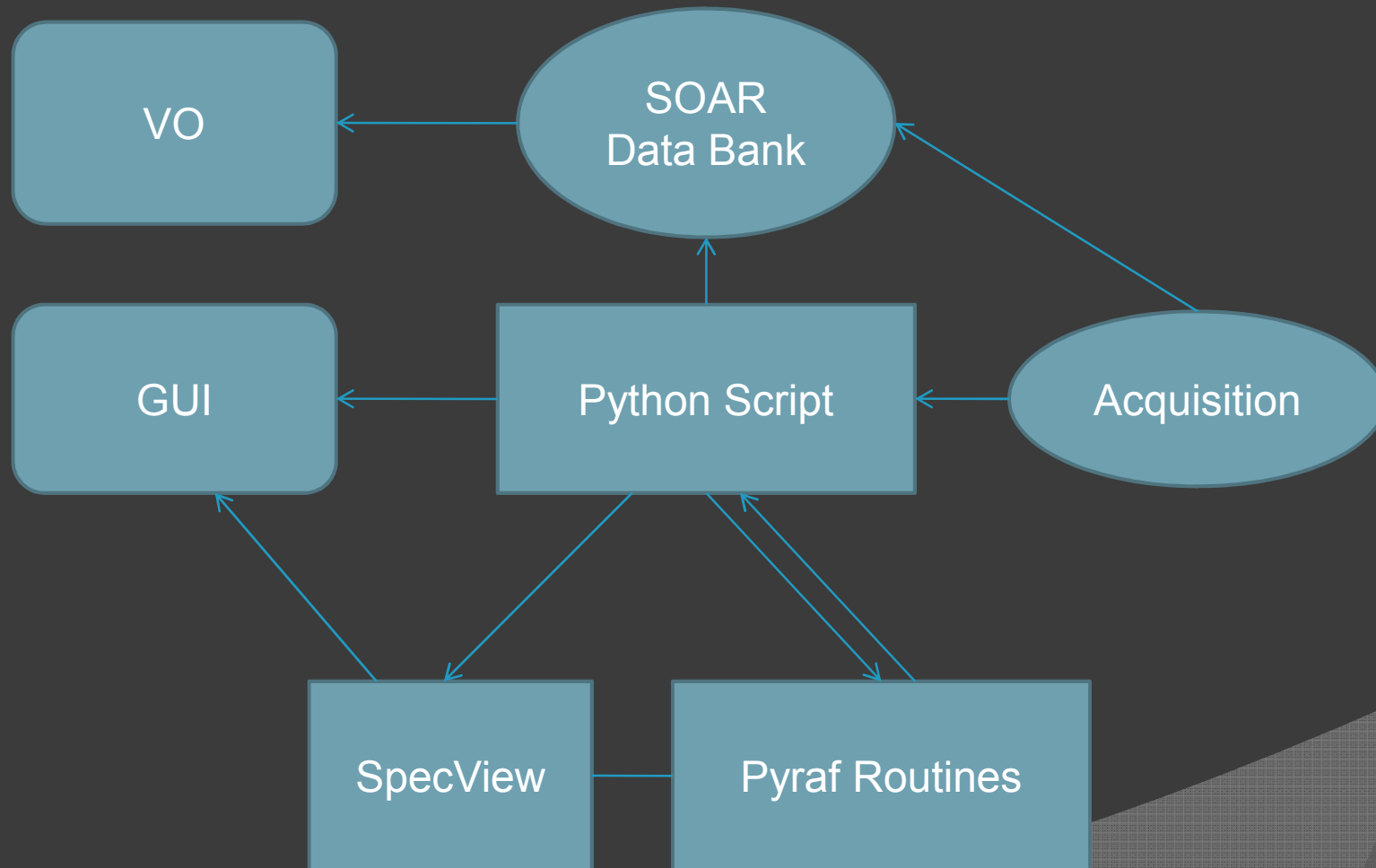
Statistics per exposure per pixel:	e-	sigma
Source	10001	100.0
Background	1	1.0
Dark	0	0.0
Readout	0	0.0
Net	10002	100.0

Signal-to-Noise Statistics:
100 per exposure per pixel
223 per exposure per 0.208 Angstroms (5 pixel) resolution element

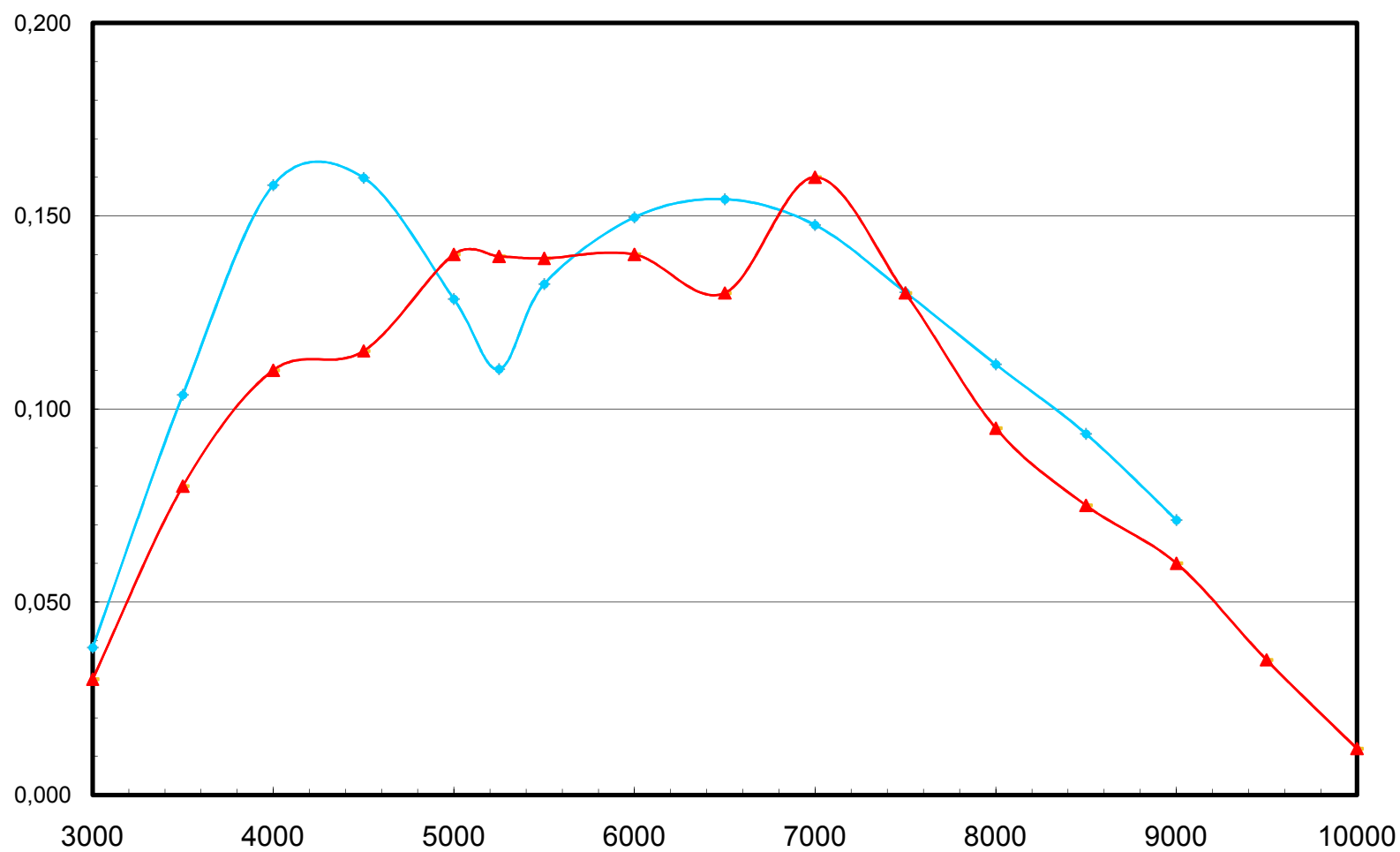
Exposure time: 919.61s (0:15:19.6)



Data Reduction - Structure

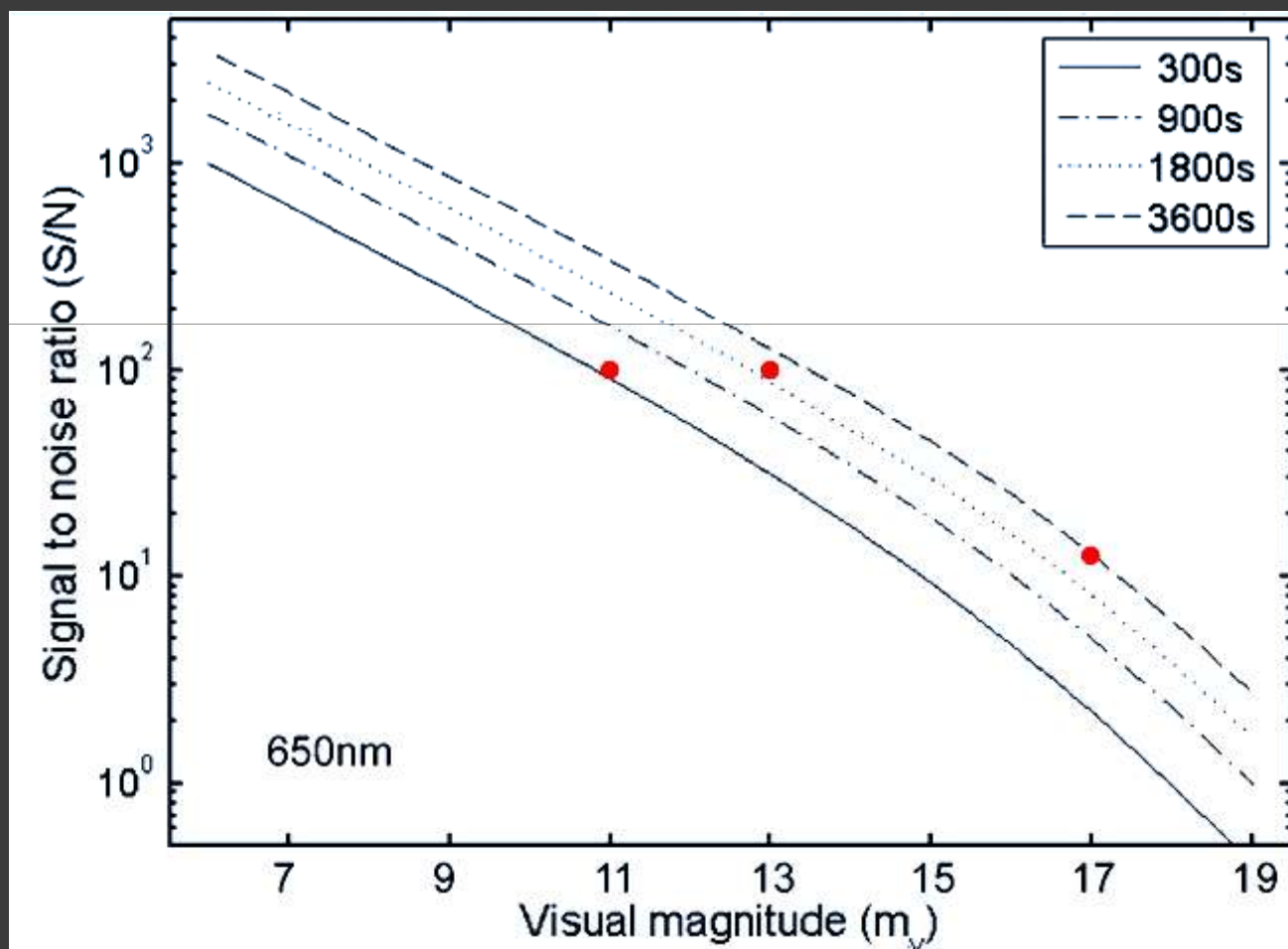


Eficiência



Eficiência

M _v	S/N	Tmin
11	100	5
13	100	30
17	12	60



650nm
0.8"
dark time

Num	V	T_{eff}	T_{exp}
ABD01	11.24	4700	15
ABD02	10.57	4800	10
ABD03	10.50	4550	10
ABD04	11.84	4600	30
ABD05	7.84	4850	3
ABD06	9.65	5400	5
ABD07	10.54	5100	10
ABD08	11.63	4200	30
ABD09	9.53	4800	5
ABD10	10.17	5200	5
ABD11	10.98	4200	15
ABD12	6.53	5600	2
ABD13	11.08	4750	15
ABD14	10.44	5600	10
ABD15	9.96	5200	5
ABD16	8.90	5800	4
ABD17	10.64	4350	12
ABD18	9.66	5500	5
ABD19	8.75	5400	4
ABD20	9.39	5400	5
ABD21	8.24	4850	3

On target	203,0
Read out	132,3
Pointing	105,0
Total	7:40hs

Redução

- um frame echelle = 1h
- 42 frames = 42hs = 1semana

Parâmetros atmosféricos

- Larg. equiv. – 1 linha = 30s
- 1 dia = 960 linhas (de 30mil)

E só foi analisada ~ 1/20 da
informação contida nos
espectros

- 1 dia = 72lin x 20ele = 1440lin x 20ele = 28800lin x 20ele = 576000lin x 20ele = 1152000lin x 20ele = 2304000lin x 20ele = 4608000lin x 20ele = 9216000lin x 20ele = 18432000lin x 20ele = 36864000lin x 20ele = 73728000lin x 20ele = 147456000lin x 20ele = 294912000lin x 20ele = 589824000lin x 20ele = 1179648000lin x 20ele = 2359296000lin x 20ele = 4718592000lin x 20ele = 9437184000lin x 20ele = 18874368000lin x 20ele = 37748736000lin x 20ele = 75497472000lin x 20ele = 150994944000lin x 20ele = 301989888000lin x 20ele = 603979776000lin x 20ele = 1207959552000lin x 20ele = 2415919104000lin x 20ele = 4831838208000lin x 20ele = 9663676416000lin x 20ele = 19327352832000lin x 20ele = 38654705664000lin x 20ele = 77309411328000lin x 20ele = 154618822656000lin x 20ele = 309237645312000lin x 20ele = 618475290624000lin x 20ele = 1236950581248000lin x 20ele = 2473901162496000lin x 20ele = 4947802324992000lin x 20ele = 9895604649984000lin x 20ele = 19791209299968000lin x 20ele = 39582418599936000lin x 20ele = 79164837199872000lin x 20ele = 158329674399744000lin x 20ele = 316659348799488000lin x 20ele = 633318697598976000lin x 20ele = 1266637395197952000lin x 20ele = 2533274790395904000lin x 20ele = 5066549580791808000lin x 20ele = 10133099161583616000lin x 20ele = 20266198323167232000lin x 20ele = 40532396646334464000lin x 20ele = 81064793292668928000lin x 20ele = 162129586585337856000lin x 20ele = 324259173170675712000lin x 20ele = 648518346341351424000lin x 20ele = 1297036692682702848000lin x 20ele = 2594073385365405696000lin x 20ele = 5188146770730811392000lin x 20ele = 10376293541461622784000lin x 20ele = 20752587082923245568000lin x 20ele = 41505174165846491136000lin x 20ele = 83010348331692982272000lin x 20ele = 166020696663385964544000lin x 20ele = 332041393326771929088000lin x 20ele = 664082786653543858176000lin x 20ele = 1328165573307087716352000lin x 20ele = 2656331146614175432704000lin x 20ele = 5312662293228350865408000lin x 20ele = 10625324586456701730816000lin x 20ele = 21250649172913403461632000lin x 20ele = 42501298345826806923264000lin x 20ele = 85002596691653613846528000lin x 20ele = 170005193383307227693056000lin x 20ele = 340010386766614455386112000lin x 20ele = 680020773533228910772224000lin x 20ele = 1360041547066457821544448000lin x 20ele = 2720083094132915643088896000lin x 20ele = 5440166188265831286177792000lin x 20ele = 10880332376531662572355584000lin x 20ele = 21760664753063325144711168000lin x 20ele = 43521329506126650289422336000lin x 20ele = 87042659012253300578844672000lin x 20ele = 174085318024506601157689344000lin x 20ele = 348170636049013202315378688000lin x 20ele = 696341272098026404630757376000lin x 20ele = 1392682544196052809261514752000lin x 20ele = 2785365088392105618523029504000lin x 20ele = 5570730176784211237046059008000lin x 20ele = 11141460353568422474092118016000lin x 20ele = 22282920707136844948184236032000lin x 20ele = 44565841414273689896368472064000lin x 20ele = 89131682828547379792736944128000lin x 20ele = 178263365657094759585473888256000lin x 20ele = 356526731314189519170947776512000lin x 20ele = 713053462628379038341895553024000lin x 20ele = 1426106925256758076683791106048000lin x 20ele = 2852213850513516153367582212096000lin x 20ele = 5704427701027032306735164424192000lin x 20ele = 11408855402054064613470328848384000lin x 20ele = 22817710804108129226940657696768000lin x 20ele = 45635421608216258453881315393536000lin x 20ele = 91270843216432516907762630787072000lin x 20ele = 182541686432865033815525261574144000lin x 20ele = 365083372865730067631050523148288000lin x 20ele = 730166745731460135262101046296576000lin x 20ele = 1460333491462920270524202092593152000lin x 20ele = 2920666982925840541048404185186304000lin x 20ele = 5841333965851681082096808370372608000lin x 20ele = 11682667931703362164193616740745216000lin x 20ele = 23365335863406724328387233481490432000lin x 20ele = 46730671726813448656774466962980864000lin x 20ele = 93461343453626897313548933925961728000lin x 20ele = 186922686907253794627097867851923456000lin x 20ele = 373845373814507589254195735703846912000lin x 20ele = 747690747629015178508391471407693824000lin x 20ele = 1495381495258030357016782942815387648000lin x 20ele = 2990762990516060714033565885630775296000lin x 20ele = 5981525981032121428067131771261550592000lin x 20ele = 11963051962064242856134263542523101184000lin x 20ele = 23926103924128485712268527085046202368000lin x 20ele = 47852207848256971424537054170092404736000lin x 20ele = 95704415696513942849074108340184809472000lin x 20ele = 191408831393027885698148216680369618944000lin x 20ele = 382817662786055771396296433360739237888000lin x 20ele = 765635325572111542792592866721478475776000lin x 20ele = 1531270651144223085585185733442956951552000lin x 20ele = 3062541302288446171170371466885913903104000lin x 20ele = 6125082604576892342340742933771827806208000lin x 20ele = 12250165209153784684681485867543655612416000lin x 20ele = 24500330418307569369362971735087311224832000lin x 20ele = 49000660836615138738725943470174622449664000lin x 20ele = 98001321673230277477451886940349244899328000lin x 20ele = 196002643346460554954903773880698489798656000lin x 20ele = 392005286692921109909807547761396979597312000lin x 20ele = 784010573385842219819615095522793959194624000lin x 20ele = 1568021146771684439639230191045587918389248000lin x 20ele = 3136042293543368879278460382091175836778496000lin x 20ele = 6272084587086737758556920764182351673556992000lin x 20ele = 12544169174173475517113841528364703347113984000lin x 20ele = 25088338348346951034227683056729406694227968000lin x 20ele = 50176676696693902068455366113458813388455936000lin x 20ele = 100353353393387804136910732226917626776911872000lin x 20ele = 200706706786775608273821464453835253553823744000lin x 20ele = 401413413573551216547642928907670507107647488000lin x 20ele = 802826827147102433095285857815341014215294976000lin x 20ele = 1605653654294204866190571715630682028430589952000lin x 20ele = 3211307308588409732381143431261364056861179904000lin x 20ele = 6422614617176819464762286862522728113722359808000lin x 20ele = 12845229234353638929524573725045456227444719616000lin x 20ele = 25690458468707277859049147450090912454889439232000lin x 20ele = 51380916937414555718098294900181824909778878464000lin x 20ele = 102761833874829111436196589800363649819557756928000lin x 20ele = 205523667749658222872393179600727299639115513856000lin x 20ele = 411047335499316445744786359201454599278231027712000lin x 20ele = 822094670998632891489572718402909198556462055424000lin x 20ele = 1644189341997265782979145436805818397112924110848000lin x 20ele = 3288378683994531565958290873611636794225848221696000lin x 20ele = 6576757367989063131916581747223273588451696443392000lin x 20ele = 13153514735978126263833163494446547176903392886784000lin x 20ele = 26307029471956252527666326988893094353806785773568000lin x 20ele = 52614058943912505055332653977786188707613571547136000lin x 20ele = 105228117887825010110665307955572377415227143094272000lin x 20ele = 210456235775650020221330615911144754830454286188544000lin x 20ele = 420912471551300040442661231822289509660908572377088000lin x 20ele = 841824943102600080885322463644579019321817144754176000lin x 20ele = 1683649886205200161770644927289158038643634289508352000lin x 20ele = 3367299772410400323541289854578316077287268579016704000lin x 20ele = 6734599544820800647082579709156632154574537158033408000lin x 20ele = 13469199089641601294165159418313264309149074316066816000lin x 20ele = 26938398179283202588330318836626528618298148632133632000lin x 20ele = 53876796358566405176660637673253057236596297264267264000lin x 20ele = 107753592717132810353321275346506114473192594528534528000lin x 20ele = 215507185434265620706642550693012228946385189057069056000lin x 20ele = 431014370868531241413285101386024457892770378114138112000lin x 20ele = 862028741737062482826570202772048915785540756228276224000lin x 20ele = 1724057483474124965653140405544097831571081512456552448000lin x 20ele = 3448114966948249931306280811088195663142163024913104896000lin x 20ele = 6896229933896499862612561622176391326284326049826209792000lin x 20ele = 13792459867792999725225123244352782652568652099652419584000lin x 20ele = 27584919735585999450450246488705565305137304199304839168000lin x 20ele = 55169839471171998900900492977411130610274608398609678336000lin x 20ele = 110339678942343997801800985954822261220549216797219356672000lin x 20ele = 220679357884687995603601971909644522441098433594438713344000lin x 20ele = 441358715769375991207203943819289044882196867188877426688000lin x 20ele = 882717431538751982414407887638578089764393734377754853376000lin x 20ele = 1765434863077503964828815775277156179528787468755509706752000lin x 20ele = 3530869726155007929657631550554312359057574937511019413504000lin x 20ele = 7061739452310015859315263101108624718115149875022038827008000lin x 20ele = 14123478904620031718630526202217249436230299750044077654016000lin x 20ele = 28246957809240063437261052404434498872460599500088155308032000lin x 20ele = 56493915618480126874522104808868997744921199000176310616064000lin x 20ele = 112987831236960253749044209617737995489842398000352621232128000lin x 20ele = 225975662473920507498088419235475990979684796000705242464256000lin x 20ele = 451951324947841014996176838470951981959369592001410484928512000lin x 20ele = 903902649895682029992353676941903963918739184002820969857024000lin x 20ele = 1807805299791364059984707353883807927837478368005641939714048000lin x 20ele = 3615610599582728119969414707767615855674956736011283879428096000lin x 20ele = 7231221199165456239938829415535231711349913472022567758856192000lin x 20ele = 14462442398330912479877658831070463422699826944045135517712384000lin x 20ele = 28924884796661824959755317662140926845399653888090271035424768000lin x 20ele = 57849769593323649919510635324281853690799307776180542070849536000lin x 20ele = 115699539186647299839021270648563707381598615552361084141699072000lin x 20ele = 231399078373294599678042541297127414763197231104722168283398144000lin x 20ele = 462798156746589199356085082594254829526394462209444336566796288000lin x 20ele = 925596313493178398712170165188509659052788924418888673133592576000lin x 20ele = 1851192626986356797424340330377019318105577848837777346267185152000lin x 20ele = 3702385253972713594848680660754038636211155697675554692534370304000lin x 20ele = 7404770507945427189697361321508077272422311395351109385068740608000lin x 20ele = 14809541015890854379394722643016154544844622790702218770137481216000lin x 20ele = 29619082031781708758789445286032309089689245581404437540274962432000lin x 20ele = 59238164063563417517578890572064618179378491162808875080549924864000lin x 20ele = 118476328127126835035157781144129236358756982325617750161099849728000lin x 20ele = 236952656254253670070315562288258472717513964651235500322199699456000lin x 20ele = 473905312508507340140631124576516945435027929302471000644399398912000lin x 20ele = 947810625017014680281262249153033890870055858604942001288798797824000lin x 20ele = 1895621250034029360562524498306067781740111717209884002577597595648000lin x 20ele = 3791242500068058721125048996612135563480223434419768005155195191296000lin x 20ele = 7582485000136117442250097993224271126960446868839536010310390382592000lin x 20ele = 15164970000272234884500195986448542253920893737679072020620780765184000lin x 20ele = 30329940000544469769000391972897084507841787475358144041241561530368000lin x 20ele = 60659880001088939538000783945794169015683574950716288082483123060736000lin x 20ele = 121319760002177879076001567891588338031367149901432576164966246121472000lin x 20ele = 242639520004355758152003135783176676062734299802865152329932492242944000lin x 20ele = 485279040008711516304006271566353352125468599605730304659864984485888000lin x 20ele = 970558080017423032608012543132706704250937199211460609319729968971776000lin x 20ele = 1941116160034846065216025086265413408501874398422921218639459937943552000lin x 20ele = 3882232320069692130432050172530826817003748796845842437278919875887104000lin x 20ele = 7764464640139384260864100345061653634007497593691684874557839751774208000lin x 20ele = 15528929280278768521728200690123307268014995187383369749115679503548416000lin x 20ele = 31057858560557537043456401380246614536029990374766739498231359007096832000lin x 20ele = 62115717121115074086912802760493229072059980749533478996462718014193664000lin x 20ele = 12423143424223014817382560



Fim