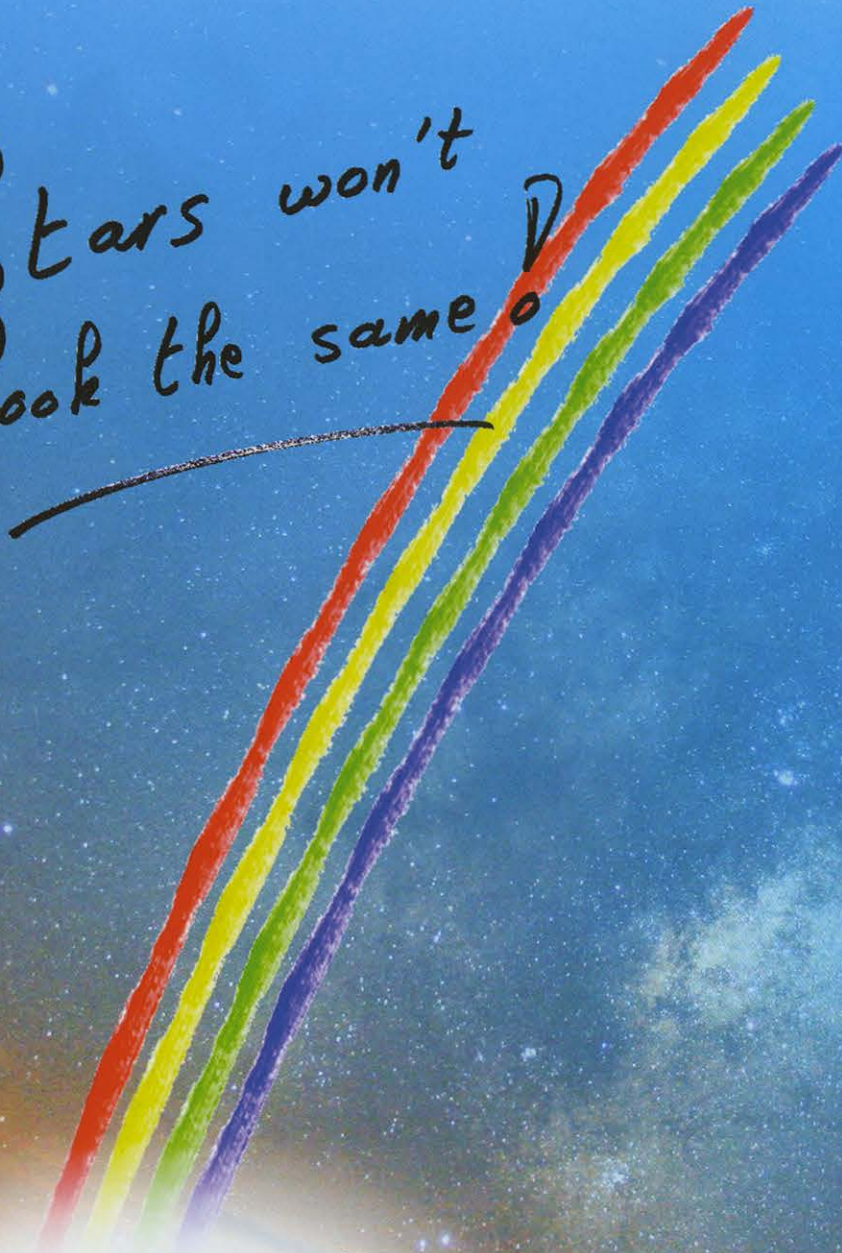


Stars won't  
look the same!



Company Seven  
LAUREL, MARYLAND 20707 • USA  
(301) 953-2000 | [www.company7.com](http://www.company7.com)

# Discover the Treasures at the End of the Rainbow...

## Do you want another astronomy ?

Beyond contemplation, spectroscopy decodes star light and reveals the underlying physics: you won't see the stars as before !

## Do you want to understand ?

Use your telescope as an educational tool to better understand the astrophysics described in books and satisfy your curiosity.

## Do you want to measure the invisible ?

Temperature, chemical composition, physical conditions, movement (rotation, pulsations, explosions, binary dance...): spectroscopy is the measurement tool you need, simple and yet so powerful !

## Do you want to participate in observing projects ?

Your measurements will be useful to the scientific community. Join observing campaigns organised in collaboration with professional and amateur astronomers all over the world.

## Spectroscopy is for YOU !

Spectrography transforms how we look at our universe. Until recent years, this technology was limited to professional observatories with... astronomical budgets!

Our passion for astronomy led us to design a complete and affordable line of spectrographs, from discovery to professional and scientific practice - including educational solutions which are important to us. You will also find from us state of the art off-the-shelf working solutions including key accessories such as guiding and acquisition cameras.

*Vous ne verrez  
plus les étoiles  
comme avant!*

*Oliver  
THIS*

Olivier Thizy  
(olivier.thizy@shelyak.com)



*Cochard*

François Cochard  
(françois.cochard@shelyak.com)



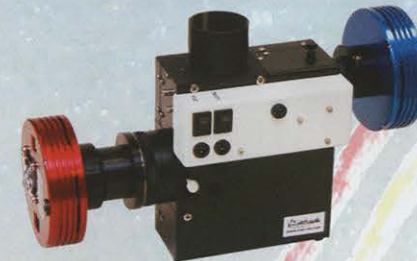
# Shelyak Instruments Products Overview



Ocultation kit



eShel



LISA Pack



LHIRES III



Alpy



Star  
Analyser



Sentinel



Lhires Lite



Handheld  
Spectroscope



Dome  
Tracker

# Handheld spectroscope / LHIRES Lite

## Show the colors to your public

In classrooms or during public outreach, visual spectroscopes are great tools to illustrate how scientists nowadays analyze starlight.

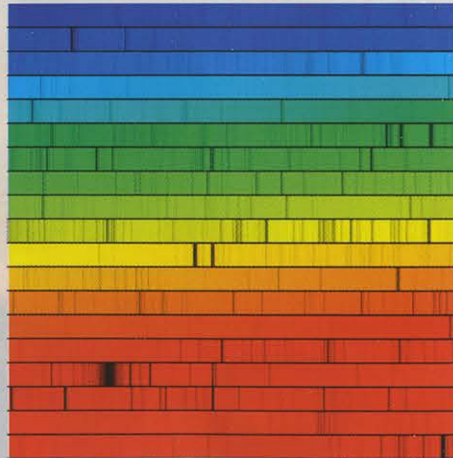


The visual **handheld spectroscope** has a very precise entrance slit providing very good resolution for such a product. It is so easy to use on any light source: sky (solar spectrum with Fraunhofer absorption lines), flame test in chemical analysis, absorption spectra through liquids, bright lines from discharge tube or any desk/street lamp...

This handheld spectroscope is ideal for use in the classroom, during public outreach or simply for you and your friends to look at street lamps differently!

**LHIRES Lite** is the best high resolution visual spectroscope: simple to use, robust and safe. It will quickly become your preferred companion for public outreach.

- \* 15µm slit: resolution of 0.02nm
- \* attaches directly to a photographic tripod
- \* gnomon to point safely toward the Sun
- \* adjustable eyepiece holder
- \* easy wavelength selection for the public
- \* changeable scale
- \* delivered with eyepiece and handling case
- \* activity booklet included
- \* weight: 800gr, size: 280x160x65mm



Credits: O. Garde, R. Leadbeater & O. Thizy

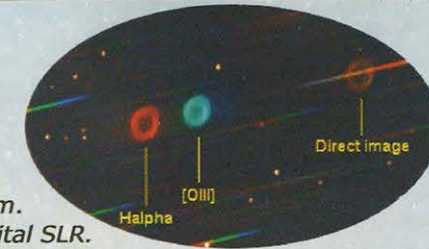
# Star Analyser

R  
100

## Discover Spectroscopy

To discover astronomical spectroscopy applications, data reduction techniques and analysis software, the best is certainly the Star Analyser. It is an high efficiency diffraction grating with 100 grooves per millimeter. Mounted in a standard 1.25" filter ring, it is very easy to use and gives the zero order image even on a small webcam chip: this helps a lot for wavelength calibration.

An optional M42/1.25" adapter will fit in front of your DSLR's T-ring to mount it on your telescope.



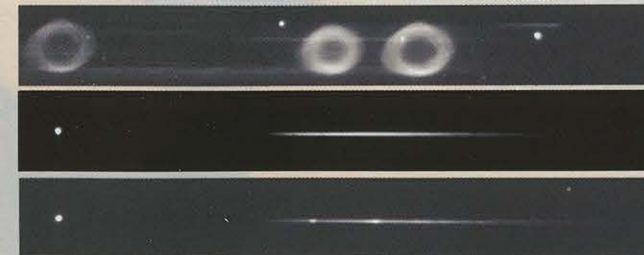
delta Virgo with a webcam.

M57 nebula with digital SLR.

The Star Analyser is the ideal spectrograph to look at stellar classification, measure the star's temperature and study faint variable stars: cataclysmic stars, novae, supernovae, etc...

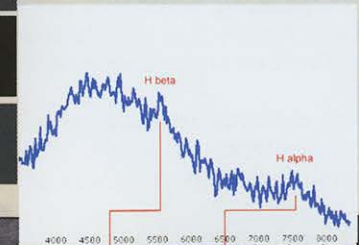
The Star Analyser is also a good first step before going into slit based higher resolution spectroscopy.

Note: the resolution of your Star Analyser can be improved by about 20% with the use of a prism to make a grism.



Spectrum of M57, Vega and Wolf-Rayet star.

Spectrum of quasar 3C273.



Credits: C. Bull, R. Leadbeater & O. Thizy. Note: "R: 100" indicates the resolving power of the instrument.

# Alpy



### A modular approach

Alpy is a new modular approach to spectroscopy, allowing progressive investment with separate Alpy 600 spectrograph, guiding and calibration modules.

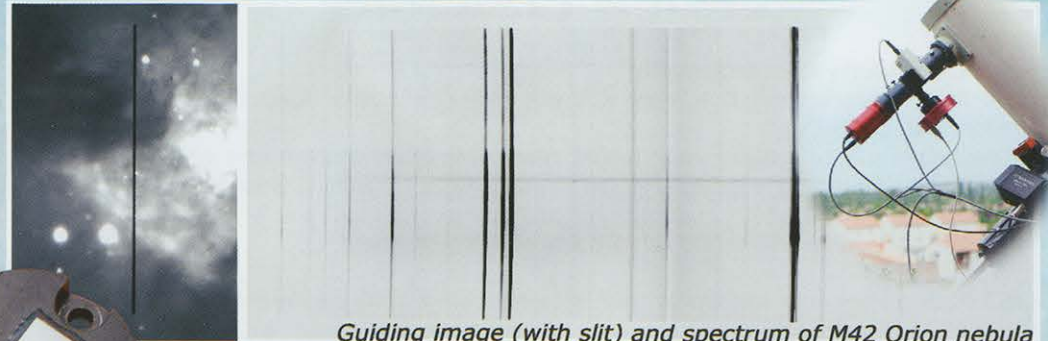
It is multi-purpose (on a bench or with a telescope; slit, slitless or with an optical fiber connector; visual use, with DSLR or with CCD camera...). The Alpy product line has been designed around standard mechanical threads to facilitate integration with your existing instrumentation.

The core element of the ALPY product line is the **Alpy 600 F/4 spectrograph**. With a 600gr/mm grism (grating + prism), Alpy 600 offers compactness, low resolution and a dispersion compatible with the current CCD cameras used in astronomy. The Alpy 600 optics have been specially designed for this spectrograph, giving an excellent quality spectrum through all the visible domain from near-UV (Balmer series, astonishing H&K lines) to near-IR (calcium triplet).

Alpy **guiding module** is the key element to use your Alpy 600 spectrograph on the stars. A reflective slit replaces the standard slit. Your telescope's field, viewed by a guiding camera, allows long exposures with your spectrograph.

Alpy **calibration module** works in front of the guiding module and the Alpy 600 spectrograph. It allows wavelength and flat calibrations to be recorded while keeping your spectrograph on the telescope.

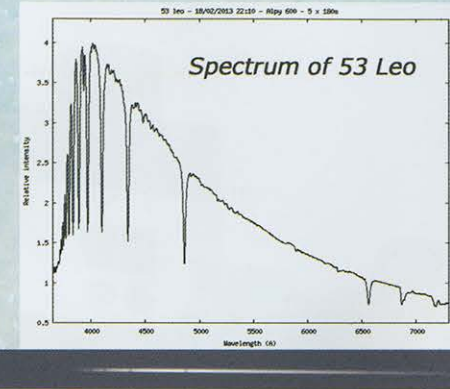
The ALPY product line benefits from our experience and expertise in the area of astronomical spectroscopy. Each module is independent, making ALPY unique and revolutionary.



reflective slit (guiding module)

Guiding image (with slit) and spectrum of M42 Orion nebula

Standard Alpy 600 slit



### Alpy 600 Specifications

- \* F/4 spectrograph
- \* Resolution: ~10A
- \* Spectral domain: 370-740nm
- \* multiple slits:
  - 25µm hole
  - 25/50/100/300µm slits (5µm tolerance; 3mm long)
  - 3mm hole slitless mode
- \* weight: 60gr (visual mode), 200gr (CCD mode)
- \* size: 65x45x45mm
- \* standard 1.25" telescope adapter with filter thread
- \* backfocus (front 1.25" adapter edge to slit): 3.8mm
- \* M42x0.75 camera thread
- \* CCD backfocus 10.5-21mm

Diameter	S/N=10 @650nm	S/N=10 @ 450nm
85mm	12.9	14.3
200mm	14.6	16.0
280mm	15.1	16.5
350mm	15.4	16.8
940mm	17.0	18.4

Limiting magnitude (A0V, 1h exposure)



### Alpy Guiding Specifications

- \* slit size: 23µm (3mm long)
- \* M42x0.75 telescope thread
- \* backfocus: 34mm (from front plate to slit)
- \* C-mount for guiding camera
- \* weight: 260g
- \* size: 90x65x75mm (without guiding camera)



### Other accessories

- \* Alpy barlow for DSLR
- \* photometric slit 23/200µm
- \* Alpy C-mount adapter
- \* Cameras
- \* Power supplies

### Alpy Calibration Specifications

- \* Argon/Neon/Hydrogen lamp for wavelength calibration
- \* tungsten lamp for flats
- \* can be operated remotely (with separate power supplies)
- \* weight: 300g
- \* size: 100x95x30mm



R  
1000

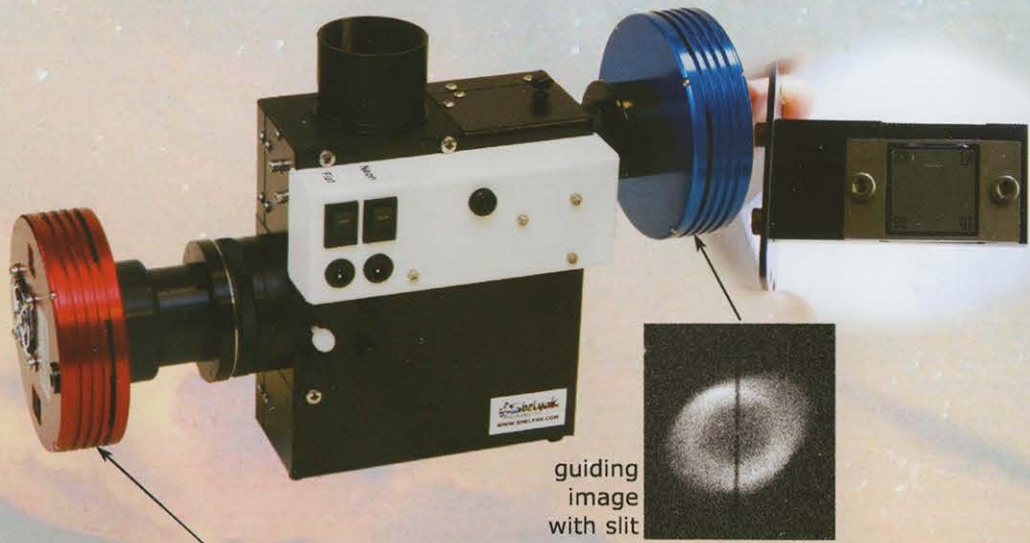
# LISA & LISA Pack

## High Luminosity Spectrography

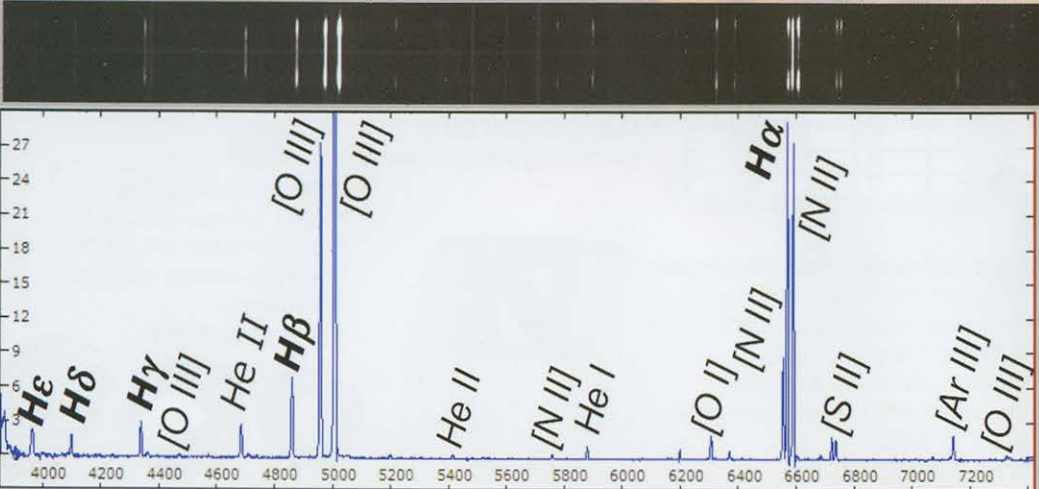
LISA Pack spectrograph is a very efficient high luminosity spectrograph with key functions to go further:

- a reflective slit to isolate your target from any other background object and to project your field onto a guiding camera: mandatory for long exposure and to reach fainter objects
- a power of resolution  $R \sim 1000$  to split key spectral features

LISA Pack makes your life easier: one-stop shopping, user documentation describing the exact same equipment as yours. Everything you need is in a convenient handling case! Just add a computer and a telescope !

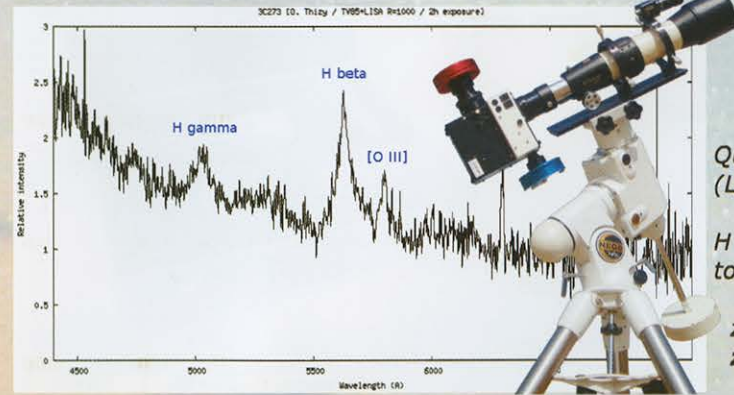
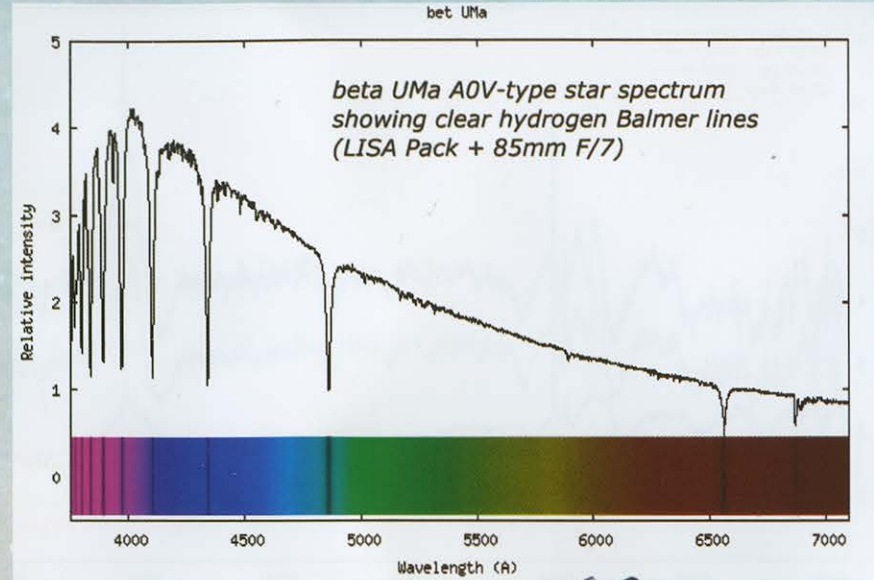


M57 spectrum



Credits: C. Bull, O. Garde & O. Thizy

LISA spectrograph is your best and easier **educational** tool for students or yourself to quickly record spectra of stars and nebulae and focus on actual projects rather than spending long hours observing.

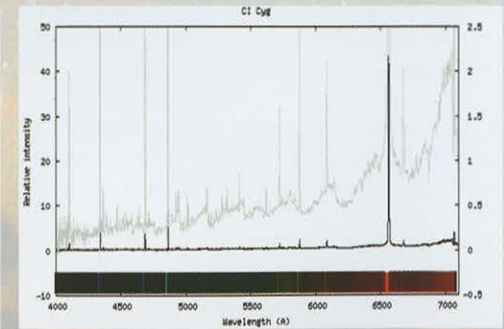
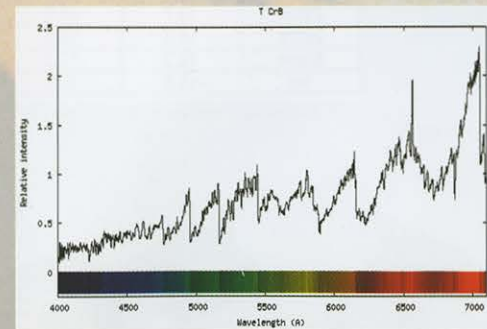


Quasar 3C273 spectrum (LISA Pack + 85mm F/7)

H beta is shifted from 4861 to 5629, giving a redshift:

$$z = \frac{5629.27}{4861.32} - 1$$

$$z = 0.158$$

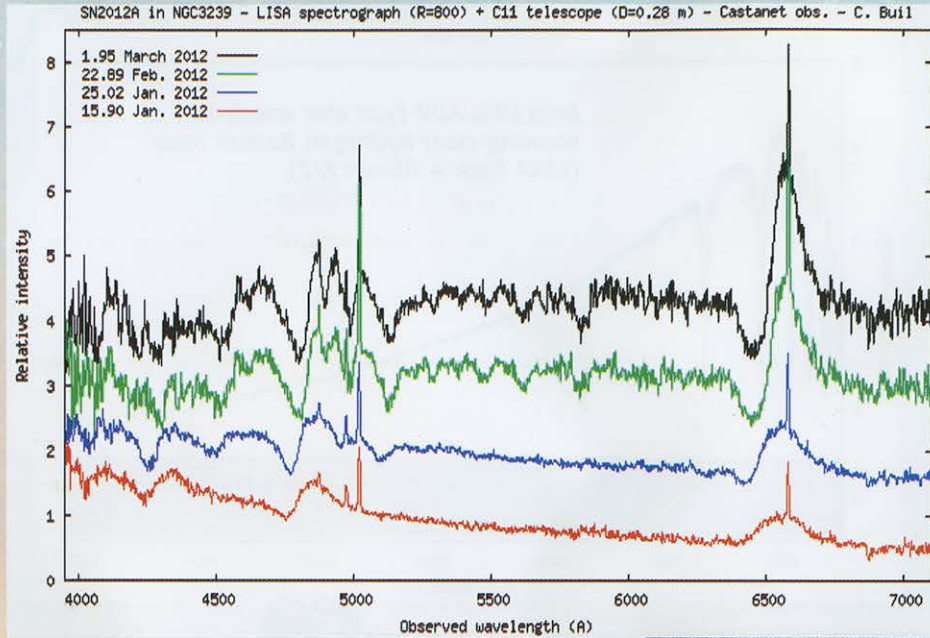


Recurrent nova T CrB in quiescence state and symbiotic star CI Cyg in outburst. Spectra recorded with LISA Pack and 85mm F/7 refractor.

LISA pack spectrograph is also a **scientific** tool to study faint objects (novae, variable stars, comets, asteroids, nebulae, galaxies, quasars...), to monitor groups of stars, to chemically analyse planets in the visible or near infra-red domain, etc...

# LHIRES III

R  
17000



### LISA Pack specifications

- \* power of resolution  $R \sim 1000$
- \* visible range (400-700nm)
- \* collimator F=130mm F/5
- \* custom lens F=88mm F/2.4
- \* slit 15/19/23/35 $\mu$ m
- \* weight: 2.5kg (1.4kg spectrograph alone)
- \* telescope interface M42x0.75 mm thread
- \* backfocus 41mm
- \* calibration module (neon & tungsten lamps)
- \* Atik 314L+ acquisition camera (1392 x 1040 x 6.45 $\mu$ m)
- \* Atik Titan guiding camera (659 x 494 x 7.4 $\mu$ m)
- \* 12V 7A power supply with 4-way cable
- \* handling case with custom foam



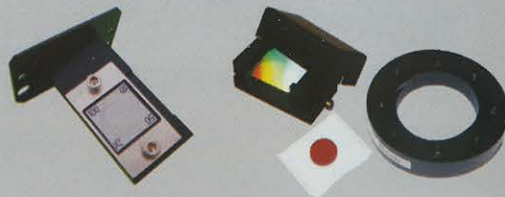
Diameter	S/N=100	S/N=20
85mm	12.1	14.1
20cm	13.7	15.7
28cm	14.3	16.3
60cm	15.3	17.3
1m	15.8	17.9

Limiting magnitude (A0V, 1h exposure)

LISA is also available alone in Visible (400-700nm) or near Infra-Red (650nm-1 $\mu$ m) versions, with or without the calibration module.

### Accessories

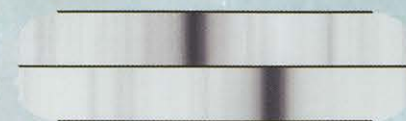
- \* slit 50/75/100 $\mu$ m with 19 $\mu$ m hole
- \* photometric slit
- \* near Infra-Red kit (600-1000nm)



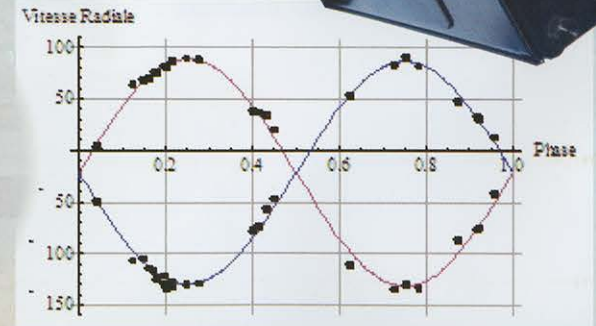
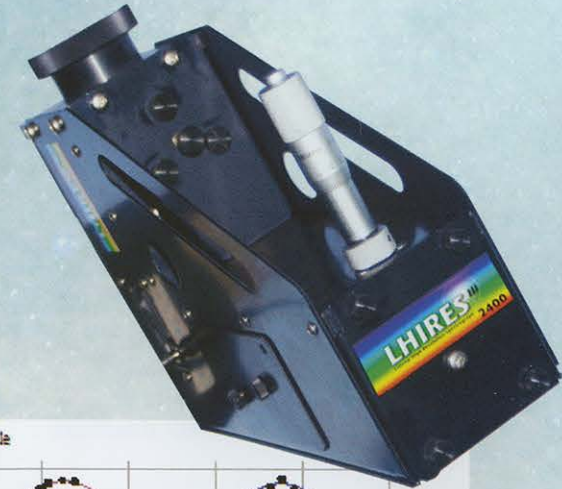
### High Resolution Spectroscopy

LHIRES III spectrograph is already used by hundreds of astronomers all around the world. With its very high resolution and simplicity of use, LHIRES III brings educational projects to amateur astronomers :

- \* Jupiter or Saturn rotation
- \* stellar radial velocities
- \* stellar rotation:  $v \cdot \sin(i)$
- \* spectroscopic binaries
- \* and much more...



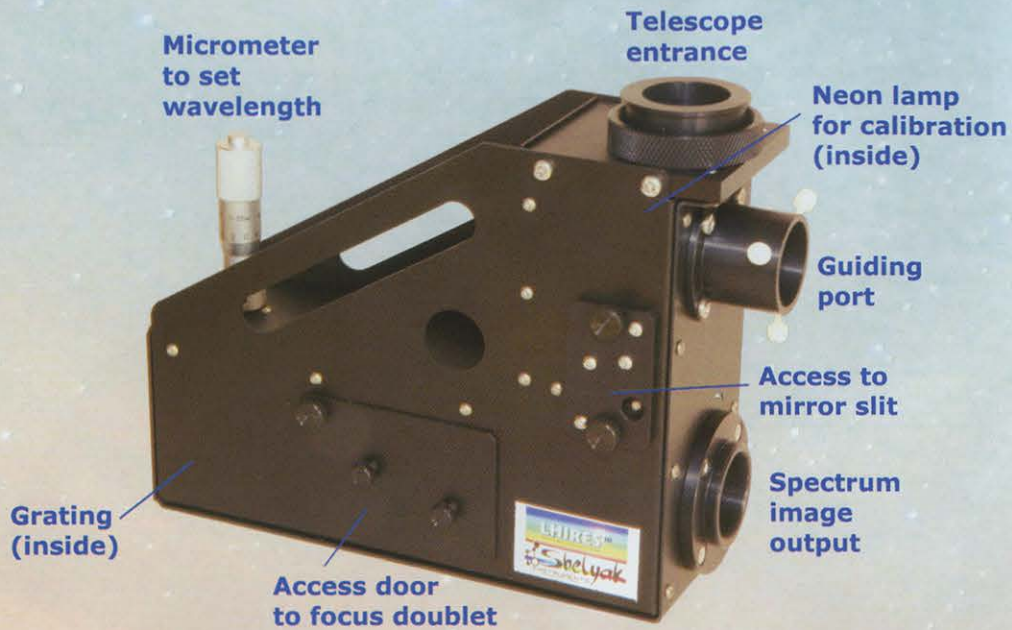
Stellar Radial Velocities



Spectroscopic binary beta Aurigae

Zeta Ori			
O9.5b			
Regulus			
B7V			
Rigel			
B8I			
Vege			
A0V			
Deneb			
A2I			
Procyon			
F5IV-V			
Capella			
G5III			
Arcturus			
K1III			
Betelgeuse			
M1-2Ie			
Antares			
M1.5Iab			
Delta Vir			
M3III			
Ca II 8498 A	Ca II 8542 A	Ca II 8662 A	

Spectral classification in near-IR (1200gr/mm module) with digital SLR.



**Lhires III Specifications:**

- \* power of resolution of 17000
- \* resolution of 0.3 Å, dispersion of 12 Å/mm
- \* optimised for f/8-f/12 instruments
- \* suitable for most types of camera: CCD, SLR, webcam...
- \* mirror slit for precise guiding
- \* optional grating and support to quickly adapt resolution to your project
- \* Visual solar spectrum, ideal for public viewing at astronomy events
- \* works as a spectro-heliograph
- \* compact: 250 x 200 x 83 mm
- \* weight: 1.6kg

**Accessories**

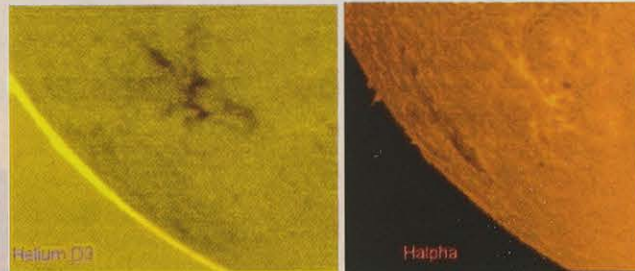
- \* additional grating modules (1800, 1200, 600, 300 or 150 gr/mm)
- \* 2 inches telescope interface
- \* CCD camera adapters
- \* photographic tripod adapter
- \* slit 50/75/100µm + 19µm hole



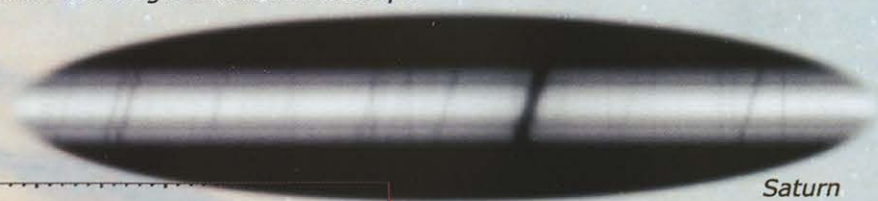
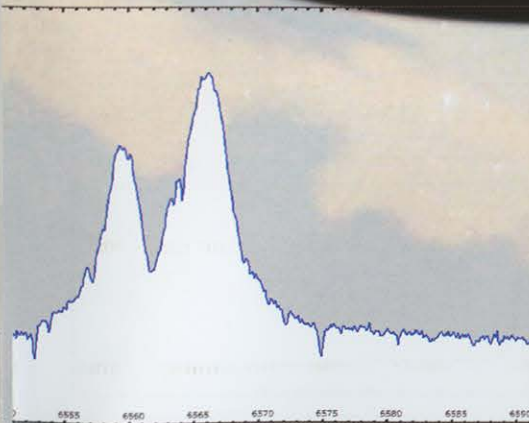
Grating module (gr/mm)	2400	1800	1200	600	300	150
Resolving power R	18617	10663	6240	2925	1441	718
Resolution (Angstroms)	0.35	0.62	1.05	2.24	4.55	9.14
Dispersion (Å/pix)	0.12	0.20	0.35	0.74	1.51	3.02
Limiting magnitude	12,0	12,6	13,2	14,0	14,8	15,5

Lhires III, 23µm slit, Atik 460EX (2x2), 3\*20min exposure, G2V type star, Halpha T300 telescope, F/D 9 (10% obstruction), 3" seeing, SNR>10 by resolving element + add 0.6 mag for 35µm slit

- subtract 0.6 mag for A0V type star
- subtract 1,3 mag for SNR>30
- subtract 0.5 mag for 200mm telescope
- subtract 3,2 mag for SNR>100



Shelyak (beta Lyrae)



Saturn



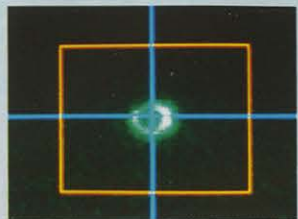
R  
10000

# eShel

**Professional optical fiber fed echelle spectroscopy solution for astronomy**  
eShel is your complete and fully operational spectroscopy solution specially designed for astronomy. This unique compact high performance instrument will allow you to run your spectroscopic observations productively.



**Fiber Injection & Guiding Unit**

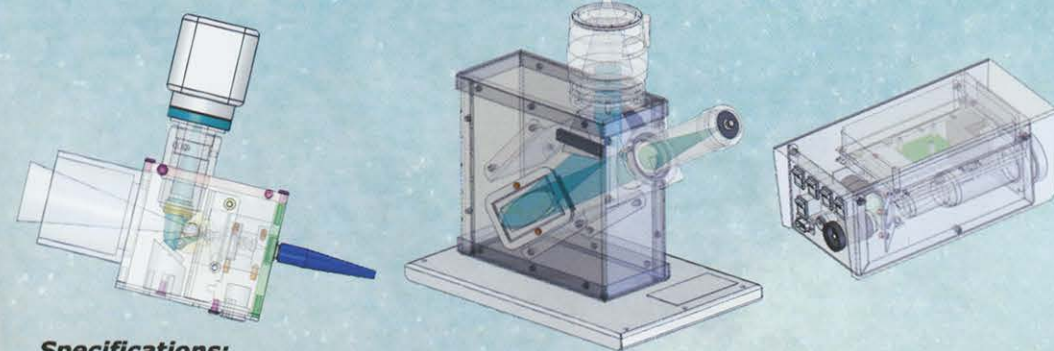


**Guiding image**

**Echelle Spectrograph**

**Easy-to-use Software**

**Thorium-Argon Calibration Unit**



## Specifications:

### Fiber Injection & Guiding Unit

Optimal telescope F/D	F/6
Mirror hole & fiber core diam.	50 µm
Telescope adaptation	M42*0.75 (T standard)
Back focus	40.8 mm
Total efficiency	60%
Weight without camera	500 gr
Size without camera	10 x 7 x 8 cm
Guiding port adaptation	C mount standard
Optional Guiding camera	Watec 120N+ recommended

### Spectrograph

Input	50 µm FC fiber
Collimator F/D	5
Grating	R2 echelle
Cross disperser	Prism
Objective	Canon EOS (85mm f/1.8)
Spectral range	430-710 nm
Power of Resolution	R > 10 000
Resolution (H $\alpha$ )	0.065 nm
Total efficiency	25%
Standard fiber's length	20 m (calibration & object)

### Calibration Unit

Calibration lamp	Thorium-Argon
Flat lamp	LEDs / Tungsten
PC interface	RS232
Dimensions	22 x 13 x 27 cm
Calibration	Automated

### Software

Operating System	MS Windows
Platform	AudeLA
Scripting/Language	Tcl/TK
Licensing	Open Source
Processing	Fully Automated
File format	FITS
Export	ASCII, BeSS

Telescope diameter	F/6 focal	Fibre Size
20 cm	1.2 m	8.3"
40 cm	2.4 m	4.2"
60 cm	3.6 m	2.8"
80 cm	4.8 m	2.1"
1 m	6.0 m	1.7"
1.2 m	7.2 m	1.4"

Optional CCD Camera	QSI516ws	QSI532ws
Chip (Kodak)	KAF1603me	KAF3200me
Size	13.8x9.2 mm	14.9x10.3 mm
Pixel size	9 µm	6.8 µm
Max QE	77%	82%

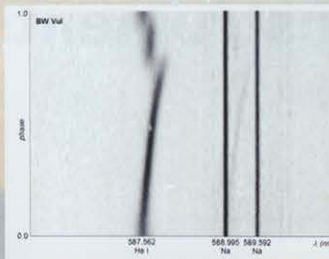
Key benefits: radial velocity accuracy; fully automated acquisition and spectra reduction process; permanent guiding on target star during exposure; ease of use...

	S/B = 20	S/B = 50	S/B = 100	Magnitude	Celestron 11 - f/5.9	60 cm - f/3.5
D=20 cm F/D=5.9 (Celestron 8)	8.9	8.0	7.1	3	37 m/s	18 m/s
D=28 cm F/D=5.9 (Celestron 11)	9.6	8.7	7.7	4	56 m/s	28 m/s
D=35 cm F/D=5.9 (Celestron 14)	10.0	9.0	8.1	5	95 m/s	46 m/s
D=40 cm F/D=4.0 (Dobson)	10.3	9.2	8.4	6	175 m/s	75 m/s
D=60 cm F/D=3.5	11.0	10.0	9.1	7	360 m/s	140 m/s
D=100 cm F/D=3.5	11.5	10.5	9.6			

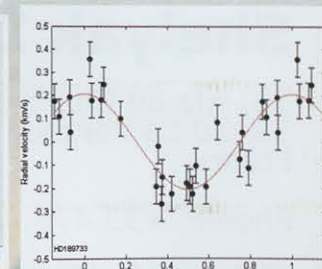
Limiting magnitude in 1h exposure and Radial Velocity performances

## Applications in Astronomy for Education & Research

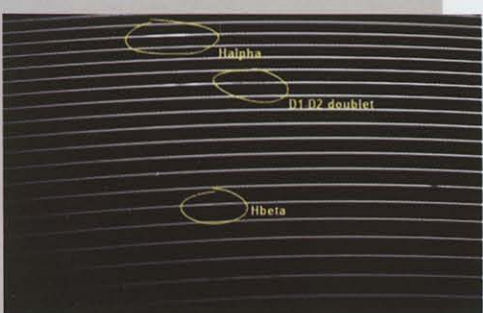
- \* Exoplanets & Binaries  
*(the only off-the-shelf echelle spectrograph to have measured several exoplanets)*
- \* Variable stars monitoring
  - pulsating stars
  - emission lines
  - novae
- ...
- \* Element abundances
- \* Stellar classification
- \* and much more...



BW Vul pulsations



HD189733b exoplanet  
(V=7.7)



beta Lyrae (Shelyak) spectrum  
C11+eShel; 25min exposure

