Calibration using known source in VSPEC (Visual Spec) Software 28/7/2024:

Andrew Thornett www.astronomy.me.uk

References:

VSPEC – Download software http://www.astrosurf.com/vdesnoux/download.html

VSPEC – Tutorials on using software http://www.astrosurf.com/vdesnoux/tutorial.html

VSPEC - Calibration process http://www.astrosurf.com/vdesnoux/howto02.html

How to undertake calibration (my own screenshots):

Load the calibration spectrum into VPSEC



spec					
istant loois Options ?	I				
	uiff Oren		~		
	te Open		^		
	← → ✓ ↑ GOOD SPECTRA (MINE) FOR TAL	~ C Search GOOD	O SPECTRA (ML ,O		
	Organize - New folder		≣ - □ 0		
	Mame Name	Date modified Type	Size		
	Sallery No items	match your search.			
	> CneDrive				
	Downloads				
	Documents #				
	Pictures 🌧				
	noning at a				
	File name:	qmips (*.pic) qmips (*.pic)) ~		
		(fits) fit fit (bmp)*.bmp	s;*.fts		
				ENC 122	
📕 Q 🖬 🕑 🕻	🐂 💁 Inbox 🔤 How t 🖃 Calibr 🙀 Docur 🐙 🚊	🖲 🔕 🙋 🕂 Vis	suz ··· ^ 🖾 🖸	■ ■ ENG	2 4
📕 Q 🖬 💽 I	📮 💁 Inbox 🛛 Howt 📑 Calibr 🖏 Docur 🐙 🛐	♥ ∅ 	sue ···· \land 🛛 🖸	ENG	2 4
Spec	🐂 🚋 inbox 📚 Howt 📑 Calibr 🖷 Docur 🐙 🛐	9 🕐 🔨 🕂 Vis	sue ···· ^ 🛛 🖸	ENG	2
Spec	🐂 🧰 inbox \min Howt 📑 Calibr 🖷 Docur 🐙 💼	9 🕐 🤨 🕂 Vis	sus ^ 🛛 🕻	ן ער פאר פאר פאר פאר פאר פאר פאר פאר פאר פא	2 4
Spec istant Tools Options 7 i C I X, Y 0 2 0	T jo	9 🕐 🚳 🕂 Vis	sur ···· ^ 🖾 C	ן ער פאר פאר פאר פאר פאר פאר פאר פאר פאר פא	2 4
Spec start Tools Options ? R, y 0 ; 0	1 j	9 () 🧐 🥵 🔣 Vis	sur ··· ^ 🛛 C	■ 5 G C C C C C C C C C C C C C C C C C C	0
Spec istant Tools Options ?	Inbox Howt Calibr Toour I S	9 🕐 🐵 ન્યૂર્પ vis	sur ^ 🛛 C	■ 5 G C C C C C C C C C C C C C C C C C C	2
Spec istant Tools Options ? I I I I I I I I I I I I I I I I I I I	I Docur I Indox I How t I Calibr II Docur II IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	C Stearch GOOD	xue ····	■ 5 G C C C C C C C C C C C C C C C C C C	0
Spec istant Tools Options ? I I I I I I I I I I I I I I I I I I I	Inbox → Howt ← Calibr ← Docur ← → Inbox → Howt ← Calibr ← Docur ← → Inbox ← Calibr ← Calibr ← ← Docur ← → Inbox ← Calibr ← ← Calibr ← ← → Inbox ← Calibr ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ←	C Search GOOD		■ 5 S S S S S S S S S S S S S S S S S S	0
Spec istant Tools Options ? C R. 10 (0, 5 0)	Index Wer How t Calibr	C Search GOOD	ин ··· ∧ ⊠ С) SPECTRA (М , р ≣ + □ 0 Size	■ 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0
Spec: istant Tools Options ? T R P (0, r, 0)	Inbox We Howt Calibr Image: Docur Image: Im	C Search GOOD		u u u u u u u u u u u u u u u u u u u	0
Spec istant Tools Options ? ☐ □ ×.y (0; ; 0	Inbox → Howt ← Calibr ← Docur ← G	C Search GOOD Date modified Type 10/08/2018 23:36 ASFiel 10/08/2018 23:37 ASFiel	ANE A DE C	ENG ♥ 4× ■ 1222 UK ♥ 4× ■ 28/07/202	0
Spec: istant Tools Options ? Image: Control of the second secon	Inbox → Howt ← Calibr ← Docur ← G	C Search GOOD Date modified Type 10/08/2018 23:36 ASFley 10/08/2018 23:39 ASFley	ANE A DE C	ENG ♥ 4× ■ 1222 UK ♥ 4× ■ 28/07/202	0
Spec istart Tools Options ? C R. Y D ; 0	Inbox → Howt ← Calibr ← Docur ← G	C Search GOOD Constraint of the second sec	ANE A DE C	ENG ♥ 4× ■ 1222 UK ♥ 4× ■ 28/07/202	0
Spec istart Tools Options ? I I I I I I I I I I I I I I I I I I I	Inbox → Howt ← Calibr ← Docur ← G	C C Search GOOD Date modified Type 10/08/2018 23:36 ASFiet 10/08/2018 23:37 ASFiet ASFie	AUX ···	ENG ♥ 4× ■ 122 UK ♥ 4× ■ 28/07/202	24
Spec istart Tools Options ? I I I I I I I I I I I I I I I I I I I			AUX ···	ENG ♥ 4× ● 122 UK ♥ 4× ● 28/07/202	24
Spec istart Tools Options ? I I I I I I I I I I I I I I I I I I I			AUX ··· A Z C	ENG ♥ 4× ■ 122 UK ♥ 4× ■ 28/07/202	24
Spec istant Tools Options 7 C I A, Y D 2 0	Inbox How Calibr Docur Docur Marrie Galler Merre Galler Genebre Genebre Genebre Genebre Galler Galler Genebre Galler Genebre Galler Galler Genebre Galler Galler Galler Galler Galler Genebre Galler Galler Genebre Galler Genebre Galler Galler Genebre Galler Genebre Genebre Genebre Galler Genebre		AUX ··· A 22 C	E G () () () () () () () () () (
Spec istant Tools Options 7 C I A, y D 2 0	Calibr Docur Hown Calibr Docur Calibr Docur Calibr Docur Calibr Docur Calibr Docur Calibr Docur Calibr Docur Docur Calibr Docur Calibr Docur Cal	C C Search 6000 Date modified Type O Search 6000 Date modified Type To/00/2018 23:36 ASFree To/00/2018 23:37 ASFree To/00/2018 23:32 ASFree To/00/2018 23:53 ASFree	AUX ··· A Z C	E G () () () () () () () () () (24
Spec estant Tools Options ?	Inbox Howt Calibr Docur Image: Calibration Image: Calibration Image: Calibration Image: Calibration Image: Calibration Image: Calibration Image: Calibration	C Search 6000 Date modified Type O C Search 6000 Date modified Type To/08/2018 23:36 ASFret To/08/2018 23:25 ASFret	ANE A DE C	E G (V)	0
Spec estant Tools Options ? ☐ ☐ ¬, y 0 ; 0	Inbox How Calibr Docur Docur Provention Proventi	C Search GOOD C S	ANE A DE C	ENG ♥ 4× ■ 122 28/07/202	2 0
Spec istant Tools Options ? ☐ □ ×, y 0 ; 0	Inbox Howt Calibr Docur Image: Calibr Image: Calibr <td>C C Search GOOD C C C Search GOOD C C C Search GOOD Search GOD Search GOD Search GOD</td> <td>ANE A DE C SPECTRA (MLP) E - Sore View View View View View View View View View View View View View View View</td> <td>ENG ♥ 4× ■ 122 28/07/202</td> <td>24</td>	C C Search GOOD C C C Search GOOD C C C Search GOOD Search GOD Search GOD Search GOD	ANE A DE C SPECTRA (MLP) E - Sore View View View View View View View View View View View View View View View	ENG ♥ 4× ■ 122 28/07/202	24
Spec istant Teols Options ? ☆ □ = R+Y @ ≠ 0	Inbox Howt Calibr Docur Image: Calibr Image: Calibr Image: Calibr Image: Calibr Image: Calibr Image: Calibr Image: Calibre Name Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: Calibre Image: CFL 100818.frt Image: CFL 100818.frt Image: CFL 100818.frt Image: Calibre Image: CFL 100818.frt Image: CFL 100818.frt Image: CFL 100818.frt Image: Calibretion image: CFL 100818.frt Image: CFL 100818.frt Image: CFL 100818.frt	С Search GOOD V С Search GOOD Date modified Туре 10/08/2018 23:36 ASFreit 10/08/2018 23:37 ASFreit 10/08/2018 23:37 ASFreit 10/08/2018 23:38 ASFreit 10/08/2018 23:39 ASFreit 10/08/2018 23:32 ASFreit 10/08/2018 23:25 ASFreit 10/08/2018 23:26 ASFreit 10/08/2018 23:25 ASFreit 10/08/2018 23:26 ASFreit 10/08/2018 23:25 ASFreit 10/08/2018 23:26 ASFreit 10/08/2018 23:27 ASFreit 10/08/2018 23:28 ASFreit 10/08/2018 23:28 ASFreit 10/08/2018 23:29 ASFreit 10/08/2018 23:20 ASFreit	ANE A DE C	Image: Second	0
Spec istant Tools Options ? ☆ □ R+Y D = 0	Inbox How I Calibr Docur Calibr Docur Calibr Docur Calibr Docur Calibr Docur Calibration Calibra	C Search GOOD Search GOD S	ANE A DE C	In the second	24
Spec istant Tools Options ? ☆ □ R+Y D : 0	Inbox How Calibr Docur Calibr Docur Calibration image CFL 100818.ft Decur Calibration image CFL 100818.ft Decur Calibration image CFL 100818.ft		ANE A DE C	Image: Second	24
Spec istant Tools Options ? ☐ □ P+Y D : 0	Inbox How Calibr Docur Calibr Docur Calibr Docur Calibr Docur Calibr Docur Calibr Docur Calibration image CFL 100318.ft Dicuments Dicuments File game: Calibration image CFL 100318.ft	C Search 6000 C Searc	ANE A DE C	ENG © 4× m 122 28/07/202	



Extract spectrum:

-K Visual Spec		- 0	×
File Extraction Windows Options ?	. ?		
Sky background subtraction Sky background subtraction Basic calibrated profile Raw profile Calibration image CFL 100818.fit	n Cul-R Cul-R Cul-R Cul-R		
GLAstronomy/Posision Astronomy Group/Meetings	ngr. PrezentationaRMG Spectroscog Tak Sept		
🥙 🔡 Q I	📙 💽 🐂 📭 Inbox 🔤 Howt 🗔 Calibr 🖏 Docur 🐙 🚖 👽 🔅 🚱 👫 Visua … 🛛 🗛 🔯 6 🚳 🚱 🔣	 12:23 28/07/2024 	-

14 Vinual Spec File Estraction Windows Options ?	- 0 ×
😑 🔯 🖻 🗆 x,y 774; 52 I 1752.0	
梦 32767 承 1552 美 (2) ≒ ♡ 前 Ⅲ 壹 〓 論 票 票 23	
	Profile extraction X Spectrum Spectrum position Spectrum Spectrum Y: 0 Y2: 0 T Raingle Dim Sky background Sky Y Sky Y Int YY <
🥐 📑 Q 🖬 😨 📜 🚳 Inbox 🔤 Howt 🖃 Calibr 📮 Docur 🐙 🗐 🦁 🦉 🛤 👯 Visus …	^ 22/07/2024 ♣ 🥵 LNG 🗇 d× 🗩 12:23 ♣ 🕻

Press <OK>



Close <profile> box down, to leave screen looking like below:

	o ×
File Edit Format Operations Spectrometry Radiometry Assistant Tools Batch Window Options ?	
E E □ x;1 774; 92 1 1792.0 ¾0. (Å/pixel)	
ダ [2267] ≱ ⑤ = ♡ 追 証 〒 〒 追 転 〒 〒 Δ	
Friendly ■ 🖓 🖷 blos 🔹 🕱 🐹 📷 🗶 🤐 🖉 🎉 🖉 🎎 🖉 🚔 整合 🖄 🦉 👹 🖗 🖉	
Eakination image CFL 100818.ft 23	
🛱 Calibration image CFL 100818.spc 🕞 🕞 💽	
Janvariooninyoostion Airooonin woogeveening ; reservation of 18 Sept	
🥙 🚦 Q 🖬 😨 📮 💁 Inbox 🔤 Howt 📑 Calibr 🤹 Docur 🐙 🔄 🜒 🖗 🙋 🕂 Visue … 🔹 ^ 🔯 💀 🔹 22/07/202	4 🕈 🤷

Click <Spectroscopy> then <basic calibration>

🔣 Visual Spec														-	0	×
File Edit Format Operations Sp	pectrometry Radiometry	Assistant Tools	Batch Window Optic	ns ?												
🗧 🙆 🔂 🖬 🛛 x;1	Basic calibration	6	A/pizel)													
الج الحقاظ المعامة معامة المعامة معامة محمد معامة معامة محمد معامة معامة محمد معامة معامة المعامة معامة محمد معامة معامة محمد معامة معامة معامة معامة معامة معامة معامة محمد معامة معامة محمد معامة معامة معامة معامة معامة محمد معامة معامة محمد معامة معامة محمد محمد معامة محمد محمد معامة محمد محمد محمد محمد محمد محمد محمد مح	Calibration 2 lines		8													
🗸 intensity 💽 🤡 blue	Calibration multiple line	s	¥ 2 2 2 2	🖬 🖬 💧 🛎	🕅 🖬 🦊 🔀	ф				_						
Calibration image CFL 100818.	Computation preference	e			23											
Calibration image CFL 100	EW lin fit FW est fit				-0											
	EW cst 1		M	0		¢										
	Heliocentric Correction			1		6										
	Heliocentric speed corre	ection		111		=										
	One gaussian fit					24										
	Three gaussian fit															
	Fit Photosphere															
	Resampling															
		11 11		MAIM		~										
	l.			·v (٨											
L	1	<u>N</u>			Mr. ad											
	-															
GAStronomy/Plosliston Astronomy Group/Mee	itings Presentations/RAG Spectros	copy Talk Sept						-								
🥙 🔡 Q	L 🖬 💽 📜	Inbox 🚬	👔 How t 🔃 Calib	r 🕎 Docur	📲 🗐 🄇) 🐧 🔨	-K Visua		^		G	ENG UK	🧟 🕸 🗩	12:25		0

iffe Visual Spec File Edit Format Operations Spectrometry Radiometry Assistant Tools Batch Window Options ?	- 0 X
🚍 🔯 🔁 🖬 🗆 xil [505;0] I [274263.0] $\sqrt[4]{0.0.(Å/pisel)}$	
У 20267 / 承 1552 美 (3) ≒ 文 由 Ⅲ 言言論 示示 32	
Filenally ● 分目34m ● 国 (2011年1月1日) (2011年1月11日) (2011年1月11日) (2011年1月11日) (2011年1月11日) (2011年1月11日) (2011年1月11日) (2011年1月1101年1月11日) (2011年1月11日) (2011年1月1101年1月1101年1月1101年1月1101年1月1101年1月1101年1月1101年1月1101年1月1101年1月1101年1月11011	ation basique X
Calibration image CFL 100818.1#	
Cil Calibration image CFL 100818.spc	4000 Pixel 224
Line Line	Fixel 603
1	
	4500 Pixel 451
E E E E E E E E E E E E E E E E E E E	ng 7.1595
	Close OK
(BulkersoneyRelation Attraceng GroupMeeting): Presentation/RAG Spatiatoropy Tak Sept	
- 🥙 🚦 🔍 🖬 😨 🎇 Indox 🔤 Howit 🔤 Caller 👰 Docur 🐙 🗟 🔊 🖉 🦉 🕼 🕼 🖓 👘 🖓	< E 28/07/2024 A

Select 2 lines and enter line values and pixel numbers – pixel numbers can be read on top line – move cursor on plot to see red line move around corresponding to pixel value. Choose 2 easily identifiable peaks that have known wavelengths and enter the wavelength next to line 1 and line in ANGSTROMS.

Press <OK> in <Calibration Basique>



Now you can see the graph shows wavelength in angstroms on x-axis.

RECORD THE VALUE JUST TO RIGHT OF -V- (7.1595 BELOW) - THIS IS NEEDED IN NEXT STEP

- O	×
The toth round operations spectrometry associate loss batch window uptions :	
	_
/riterativ ● ● ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
Protectly 文字 Man I 医 to bas at K 经 Q 强 操 法 法 推 推 正 社 A K 推 推 课 Q 中 C Calibration image CFL 100818apc 2665 A 720 A 295	
(Buldtocomy/Brodition Actionmy GroupMeetings: Presentations/PAG Spectroscopy Tak Sept	
🥙 🚦 Q 🖬 😨 🚰 Inbox 💴 Howt 📑 Calibr 🖷 Docur 📲 🔄 👽 🔅 📴 🕂 Visuz … 🔨 🛛 🖬 🖬 🕼 🖗 d× 🗈 22/07/2024 🗣	•

Close <Calibration Basique> and calibration image to leave following:

Open 2nd spectrum you wish to determine values of lines upon.



bration image C	FL 100818.spc	-K Open				×	
			« RAG > GOOD SPECTRA (MINE) FOR TA	~ C	Search GOOD SPECTRA	(MI ,0	
		Organize 👻 New folde	r.		≣ •		
		Home	Name Aibereo brightest component star 100818 Aibereo fainter component star 100818.fit	Date modified 10/08/2018 23:36 10/08/2018 23:37	Type ASIFitsView ASIFitsView	Size	
			Alshain 100818.fit	10/08/2018 23:39	ASIFitsView		
	2665 J 3 730	 ■ Desktop * ↓ Downloads * ■ Documents * ■ Pictures * 	Arcturus 100818.fit Calibration image CFL 100818.fit Deneb 100818.fit Gienah 100818.fit	10/08/2018 23:15 10/08/2018 23:15 10/08/2018 23:25 10/08/2018 23:26	ASIFitsView ASIFitsView ASIFitsView ASIFitsView	1	
		File na	me: Altair 100818.fit	×	(fits)*.fit;*.fits;*.fts	~	
					Open 💌	Cancel	

Click <Extraction> then <basic profile>

HK Visual Spec	- o x
File Extraction Windows Options ?	
Bac solutions subtraction I 1 1225.0 - 4/7.1555 (k/pixel)	
Y Raw profile Ctrl+P I □□□□□ □ □ □ □ □ □ □ □	
_ relensity _ 」 ⑦ ■ blue _ 」 篇 w w w w Q Q Q W w w w w w w w w w w w w	
BAAstronomyRPosition Astronomy GroupMeetings Presentations/PAG Spectroscopy Tak Sept	
🥐 📑 Q 🖬 C 🐂 💁 Inbox 🐸 Howt 📑 Calibr 🖏 Docur 🐙 🗊 💔 🔅 😢 🕂 Visus 🚥 🔿	☑ C I I I I I I I I I I I I I I I I I I



Click <OK>



Click <NO> here



Close <Profile extraction> box and FIT file



Click <Spectroscopy> then <basic profile> again

- Visual Spec		- o x
File Edit Format Operations	Spectrometry Radiometry Assistant T Basic calibration	.ols Batch Window Options ? (Å/pisel)
v intensity	Calibration 2 lines	11年2月1日 - 11年4月1日 - 11日日 - 11日日
	Calibration 1 line Calibration multiple lines	
Calibration image CFL 100	Computation preferences	
	EW lin fit	
1월 Altair 100818.spc	EW est fit	
	EW cst 1	č l
	Heliocentric Correction	a la
	One gaussian fit	
	Two gaussian fit	E E
	Fit Photosphere	
	Resampling	
	N	A A
	h	
		<u> </u>
GiAstronomy/Rosliston Astronoms Broup/N	Meetings Presentations/RAG Spectroscope Talk Sept	
🧶 💻 (A Market Calibry 💼 Docur 🚚 🗟 🛐 🦚 🕫 📲 Vigue
· · ·		

In <Calibration Basique> click one line and choose one identifiable line and enter pixel value and in sampling box enter the scale (7.1595 recorded earlier) – click <OK>.

The second spectrum is now calibrated in wavelength:



Official VSPEC Tutorial Instructions on how to do calibration from

http://www.astrosurf.com/vdesnoux/howto02.html

From pixel to wavelength

Once the intensity curve is obtained, through binning, the next operation consists of establishing a relationship between pixel and wavelength.

The composition of the light has been spread out by the spectroscope device according to wavelength. Depending of the mounting chosen, this relationship can be close to linear: an equal number of pixels correspond to an equal domain of wavelength.



An equation links the pixel number to a specific wavelength:

Wavelength = a*Pixel_number + b

Once this relationship is established for the optical combination of the spectroscope, this is more or less valid for all the spectra recorded with this very same combination.

The "a" coefficient is the sampling of your system. The higher it is, the highest resolution you have, this mean the easier it will be to separate lines when they close to each other.

However, it is strongly recommended to recompute the relation for each spectrum in order to eliminate small variations like mounting/dismounting, small mechanical displacements, telescope equilibrium, atmospheric transparency.

How to identify which intensity correspond to which wavelength?

Several options shall be considered:

The spectrum itself shows easily identifiable lines which allow selfcalibration

A spectrum of a well-known star which exhibits recognizable lines is recorded before or after the studied spectrum

The spectroscope assembly includes a calibration lamp

The usage of a calibration lamp is the most accurate way to calibrate spectra. On the opposite, using the spectrum itself does not work properly in all cases and show low precision as it cannot account for doppler measurements. But this is probably the easiest one to start with.

Wavelength calibration with the spectrum itself...

This method works properly if at least two lines are easily identifiable. To calibrate the profile, you need to assign the right wavelength to each of the two lines and Visual Spec will do the rest by computing the linear fit for each pixel. As a result, each

Calibration using known source in VSPEC (Visual Spec) Software 28/7/2024; page 13

pixel will correspond to a wavelength and by dragging the cursor over the profile you will see displayed the corresponding wavelength.



As the spectrum is calibrated by respect to itself, it will not be possible to measure doppler effect as it needs to take into account wavelength shift versus the absolute value which you do not have.

Wavelength calibration with a reference star...

To calibrate the spectrum of the reference star, you need to identify two lines and to assign through Visual Spec their corresponding wavelength. Once this is done, you have to load the spectrum you want to calibrate. It is mandatory that this spectrum has been recorded in the very same conditions to not introduce errors. The assumption is that the sampling coefficient will be the same for both spectra.

First step is to record the spectrum of a known star for reference, with lines easily identifiable. Then, this spectrum shall be calibrated. Once done, the sampling coefficient shall be recorded on a piece of paper.

di Wayal Spee				
Fishing Edition Format Opérational Constant	u ábia - Dadian ábia - Outila	Foutthe Options 2		
Fichier Edition Format Operations Spectron	neme hadiometrie Outris	reneare options ?		
😑 🔂 🎦 x;1 398 ; 5631.56	I <mark>617400.0</mark> -\/- 1	5.1836 (Å/pixel)		
🔀 🜌 🔍 👰 🙀 🚨	raie 1: 6563 398.96	raie 2: 7624	567.02	
🗮 ta02.spc				×
				 ✓ ✓

If the assembly does not allow to image domain beyond 6600 angstroms, it will not be possible to use atmospheric lines as they will not show up on the spectrum.

Now, the spectrum to calibrate is loaded, and it is sufficient to identify only one line. By entering the same sampling coefficient, the new spectrum will be calibrated as well, and by dragging the cursor over the spectrum, wavelength will be displayed

- 4 Visual Spe	ec
Fichier Option	ns ?
	x;1 525 ; 7797.43 I <mark>39300.0</mark> -√- 15.18359 (Å/pixel)
5939	
🗸 intensite	
🖶 tnov2.pic	
🖆 tnov2.sp	
	Etalonnage Centre raie Barycentre: 443.7 Reset Appliquer Fermer Longueur d'onde: 6563 Echantillonage: 15.1836

Wavelength calibration with a calibration lamp...

The method is the same as for the reference star. But instead of using a star spectrum, this method uses the artificial light from a lamp which exhibits emission lines. By knowing the composition of the lamp, you can easily identify key lines and find in tables their wavelength.

In my past experience I used Argon lamp, but Neon lamp shall work as well. You just need to take care that the type of lamp you are using exhibits lines in the wavelength domain you are observing. In Infrared, Argon lamp does not have a lot of lines, which can be an issue at high resolution. This is the technic used by professionals. It will work for all types of spectra, in all type of optical combination.



The argon spectrum as per laboratory tables

Once the two spectra have been recorded, they shall be both reduced by binning into the same profile. As they were acquired in the same conditions, the Argon spectrum can be superimposed on the object spectrum, and Argon calibration will apply too.

It is easiest to calibrate the Argon one, as emission lines can be found in laboratory tables. In Visual Spec, a library of such lines is included.

In this very special case, there is few lines present. The first approximation is done by knowing by construction which spectral domain is targeted. Usually, spectroscope includes such control, the rotation angle of the camera versus the grating is a first indication of the spectral domain.

The second approximation is that by shooting in the H-alpha region, the strong line in emission shown on the star which is a Be star is likely to be the H-alpha line.

By looking at which lines are around 656.3 nm on the argon spectrum, the two lines are likely to be the 606.4 nm and the 653.8 nm argon lines.

After wavelength calibration on the Argon spectrum, one checks that star emission line is well set at 656.3nm...

