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THE BANDPASS STORY

All current CD spectropolarimeters are typically operated in constant bandpass mode. I.e. operator selects by software a bandpass (typically 1 or 2 nm) which is kept constant all over the spectral range.
With modern grating type UV-VIS spectrophotometers you do the same, but grating instruments have (approximately) constant linear dispersion, so same slitwidth will give a given bandpass at any wavelength.
Most CD spectropolarimeters are using double prism monochromators, so in order to keep constant bandpass the slitwidth must be changed continuously over the spectral range.
This was achieved in the past in an electromechanical way. For example the Jasco J-500 had a special linear potentiometer linked to the scan drive with several outputs corresponding to various wavelengths, in this mode it was possible to control slitwidth in association with the actual wavelength.
Modern PC controlled units (from J-600 to present times) are viceversa using a PROM resident program which takes care of the linear dispersion curve versus wavelength.

Since a dispersion curve is not usually supplied with the instruments, users may not be fully aware of the quantitative aspect of the phenomena. On Jasco J-800 to keep constant 1 nm bandwidth*, following slitwidths are necessary:

λ (nm)	slitwidth (μm)
1000	10
900	11
800	13
700	19
600	27
500	53
400	104
300	278
250	538
200	1344
170	2770

From the above data two points are very clear:
-operation in NIR calls for very narrow slits
-large bandpasses are not possible in the low UV since slitwidth is mechanically limited to 2 or 3 mm

Actual bandpass (SBW) used should be related to the natural bandwidth (NBW) of the sample to be scanned. The usual proper criteria says that SBW should be within 1/10 of the NBW to give an height error below 0.5%.
Table above shows however that mainly in the NIR some compromise may be necessary to get acceptable noise levels.
While high resolution (= narrow bandpass) is typically never required in CD measurements in the VIS and NIR ranges, users should be aware of the potential limitations.

** the data reported are theoretical. Actual situation is worst since three further effects take places at narrow slits:*
1- slit curvature mismatch (caused by the fact that image on the slits is not straight and its curvature is wavelength dependant)
2- diffraction limits caused by interference patterns at narrow slits, this too is wavelength related
3- to avoid mechanical problems actual minimum slitwidth may be kept (by hardware or by software) well above zero

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