

VUV CONVENTIONAL CD

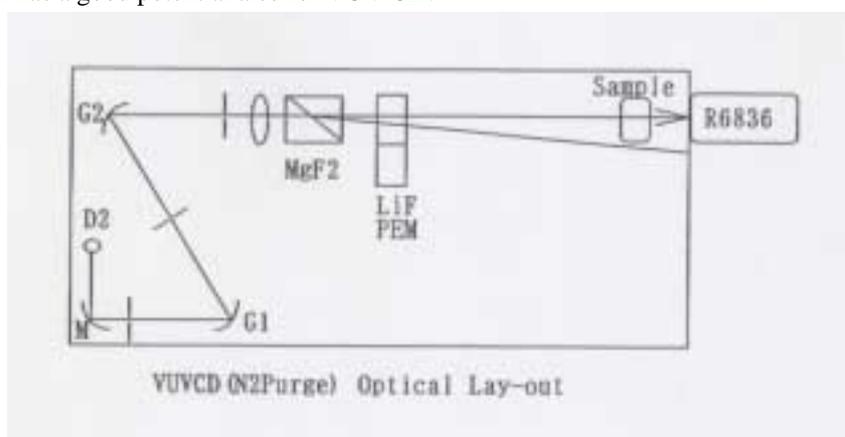
In T.R. 78 we discussed briefly about synchrotron radiation VUV CD.

As a matter of fact synchrotron radiation is available only in selected places and the cost of a dedicated beam line is huge (as starting and as running investment). VUV CD is possible also with conventional monochromators and a few instruments were home assembled in the past^{1,2}.

Today we experience a return of interest toward VUV spectroscopy, mainly stimulated by semiconductor industry, which is trying to use VUV laser for lithography.

Jasco (through the special product division Bunkoh-Keiki) has always been involved in the design and small scale manufacturing of VUV monochromators and spectrometers; the recent demand of semiconductor industries gave origin to a new double beam spectrophotometer (VUV-1000) now commercially available.

This optical bench has a good potential also for VUV CD:



Light source:	L7923 D ₂ lamp with MgF ₂ window
Monochromator:	double, subtractive mount, concave 1200l/mm MgF ₂ coated gratings, 20cm focal length, f/5 aperture, 4nm/mm linear dispersion; with manual entrance, intermediate and exit slits
Focussing lens:	CaF ₂
Linear polarizer:	MgF ₂
PEM:	LiF type (as arranged for Hiroshima synchrotron CD beam line)
Photomultiplier:	28mm Ø MgF ₂ window, head-on, R6836 solar blind Cs-Te PM tube (115-320nm range)

The photometric electronics and related software comes directly from standard J-810

Ancillary vacuum equipment's required: none, due to wavelength range the N₂ purging will be more than suitable!

The layout has only three reflective VUV coated elements between source and detector and it's built in a very robust, specially machined, housing. Practical wavelength range is expected from 140nm (limited by MgF₂ polarizer), to 300nm (where PM tube sensitivity drops).

Due to the special materials needed and expect low production, unit, which is not yet commercial, would not be cheap, but by sure competitive with synchrotron radiation choice. The technology used is also expensive, but well known and in a sense standard, and the equipment will be easy to use (and calibrate) as any conventional CD spectrometer.

A proper choice for protein secondary structure analysis and other applications where the gain of a few nanometers will be very important.

¹ Johnson W.C. Jr., *Rev. Sci. Instrum.*, 42, 1283, 1971

² Gross K.P., Schnepf O., *Rev. Sci. Instrum.*, 48, 362, 1977