CORAVEL-TYPE RADIAL VELOCITY SPECTROMETER
(COrraliation RAdial VELOCITY)
Grating
75 gr/mm
Blaze angel 68 deg

Cross-disperser
22-grad flint prism in double pass

Collimator-camera lens
F=640 mm, F/11

Slit
0.11 mm (fixed)
Spectral interval          375 - 640 nm
Orders                     38 - 63
Dispersion                 0.14 - 0.24 nm/mm
R                          ~20000
Opaque film with dimension W60xH30 containing 1650 transparent slits
A CORAVEL-TYPE PHOTOELECTRIC RADIAL-VELOCITY SPECTROMETER

How it works

Doppler effect:

\[
\frac{\Delta \lambda}{\lambda} = \frac{v}{c}
\]

Dispersion of the grating spectrograph:

\[
\frac{dx}{d\lambda} = \frac{KNF}{\cos \beta}
\]

Shift of a spectral line, at a focal plane of the spectrograph due to the Doppler effect:

\[
\Delta X = \frac{NF}{\cos \beta} \cdot \frac{v}{c} \cdot K\lambda
\]

If,

\[
K_i \lambda_i = K_j \lambda_j = \text{const}
\]

then

\[
CCF = \int I(\lambda) \cdot T(\lambda + x) \cdot dx
\]

with physical mask can be obtained.
\[ Vr = f(X) \]
Coravel (06120400)

Completed

Obj: HD 84441
Vel: 4.50
Clear
RA 09 45 51.07
DE +23 46 27.31

05/12/2008 GMT 04:23:23
JD 2454805.683 Sideral 01:54:22
cosecz 6.63
Hour angle 16:08:31

File Operation Measurement Configuration Analysis Help

Main Database ScanAnal

< Back Load Gauss Next > Refresh Write
All Media Remove Automat
All Star Std Sky Cal

Rec.N Time Use
45 12:04:06.100 V
46 12:04:06.500 V
47 12:04:06.900 V
48 12:04:07.300 V
49 12:04:07.720 V
50 12:04:08.162 V
51 12:04:08.562 V
52 12:04:08.962 V
53 12:04:09.424 V
54 12:04:09.824 V
55 12:04:10.724 V

All=478, Used=449

Unconditional load

Param Value
St.m.s. Undefined
St.m.sc.s. 8.0
Scan int. 50
Refresh rate 4

DB: 06120400 (5064.512kB)
001 00:58:37 Calibr
002 01:14:17 HD 206778
003 01:15:44 Calibr

Telescope: KittPeak230

[Graphs and data tables with various parameters and signals]
The graph shows the depth percentage (Y-axis) plotted against the B-V color index (X-axis) for different types of stars:

- **F-M dwarfs** represented by black circles.
- **F-M giants** represented by green circles.
- **A dwarfs** represented by red circles.

The data points are spread across a range of B-V values from 0.0 to 1.5, with corresponding depth percentages ranging from 0% to 40%. The graph indicates a trend where the depth percentage increases with increasing B-V values for all three types of stars.
G5 III

- [Fe/H] = -1.8
- [Fe/H] = -1.0
- [Fe/H] = 0.0
ERRORS

\[ \sigma^2 = \sigma_{fit}^2 + \sigma_{std}^2 + \sigma_{slit}^2 \]

\[ \sigma_{fit} \sim 0.01 - 2 \text{ km/s} \]

\[ \sigma_{std} \sim 0.1 - 0.5 \text{ km/s} \]

\[ \sigma_{slit} \sim 0.3 \text{ km/s} \text{ ?} \ 1/t \text{ ?} \]
$P = 764.0 \, \text{d}$, $K = 3.9 \, \text{km/s}$, $e = 0.56$, $\Delta T = 1572 \, \text{d}$ (4.3 yr.)

$\sigma(O-C) = 0.56 \, \text{km/s}$
$M_1 + M_2 = (a_1 + a_2)^3 / P^2$

**Binary Star Orbit**

- Orbit of higher mass star
- Focal point
- Center of mass
- Radius vector
- Focal point
- Orbit of lower mass star
V 2109 CYG,
Coravel, T63, MAO
2008.08.14
Transiting exoplanets from the CoRoT space mission

II. CoRoT-Exo-2b: A transiting planet around an active G star

Fig. 2. Normalized and phase folded light curve of 78 transits of CoRoT-Exo-2b (top), and the residuals from the best-fit model (bottom). The bin size corresponds to 2.5 min, and the 1-sigma error bars have been estimated from the dispersion of the points inside each bin. The residuals of the in-transit points are larger due to the effect of successive planet occultations of stellar active regions.

Fig. 3. Phase folded radial velocity measurements of CoRoT-Exo-2, together with the final fitted semi-amplitude ($K$) and the applied offsets between the instruments. Filled circles: SOPHIE, open circles: HARPS, open triangles: CORALIE. In the bottom panel, the total span of the CCF bisectors, as measured in the HARPS spectra.
Fig. 1. Radial velocity vs. Julian date. The solid line is the model with the orbital parameters from our fit. Open circles are individual measurements and filled circles are the weighted mean of those individual measurements. Error bars are from the standard deviation of the weighted mean, Eq. 3.