KPOL Data Structure and Analysis Software

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KPOL DATA STRUCTURE and ANALYSIS SOFTWARE

SCORE Project

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CHANGE LOG

Date	issue	Revision	released by	comments
07 Nov 2007	0.0		S. Giordano	Preliminary release sent to team members
22 Jan 2009	1.0		S. Giordano	Improved software description

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Present Kpol Data Structure

In this section we describes the KPOL data structure saved by the acquisition software (TBD reference) at the time of release 1.0 of the present document. These data can be read by Data Processing and Analysis software, briefly described in the following section.

Keyword	Туре	Value	Units/Format	Description
FILE	STRING	'12_10_2007_9_12_25-data.dat'		Name of data file
PATH	STRING	'/SCORE_DDAS/KPOL/DATA/'		Path of data file
DATE ODS	STRING	112/10/2007		Date of the start of the
DATE_OBS	STRING	12/10/2007		observation
TIME OBS	STRING	'9:12:25'		Time of the start of the
	STRING			observation
WAVE	STRING	'550'	nm	Wavelength
LCVR_TEMP	STRING	'30'	С	LCVR Temperature
LCVR_VOLT	STRING	'200'	mV	LCVR Voltage
STATUS (1)	STRING	'raw'		Calibration status
PFIT (2)	FLOAT	Array[4]		Fit Parameters
Data				
EXPID	INT	Array[56]		Exposure ID
DATE_XOBS	STRING	Array[56]	12/10/2007	Date of the start of the
				exposure
TIME_XOBS	STRING	Array[56]	9:12:25	Time of the start of the
				exposure
POLROT	FLOAT	Array[56]	deg	Polarizer Angle
IOUT	DOUBLE	Array[56]	cnt/gatetime	Observed Intensity
IOUTERR	DOUBLE	Array[56]	cnt/gatetime	Observed Intensity Error
IIN	FLOAT	Array[56]	W	Diode
IINERR	FLOAT	Array[56]	W	Diode Error
ICAL	DOUBLE	Array[56]	TBD	Calibrated Intensity
ICALERR	DOUBLE	Array[56]	TBD	Calibrated Intensity Error

Table 1: KPOL data structure

Notes:

(1) The possible values of STATUS keyword have to be defined, e.g. by following the definition reported in Table 1.

STATUS value	Description
raw	Raw data
drk	Dark count subtracted data
bck	Background subtracted data
clb	Fully calibrated data (normalized to diode
	flux)

Table 2: Proposed values of STATUS keyword

An open issue is the data calibration flow, which must be defined and described in order determine the values of STATUS, and to develop the data processing code.

(2) PFIT contains the parameters (A, p, b) of the function used to fit the data:

$$\frac{A}{2} \left[\cos \left[4 \frac{\pi}{180} (x - p) \right] + 1 \right] + b \qquad \text{Equation 1}$$

in detail: PFIT(0) = A = Amplitude, PFIT(1) = p = Phase, PFIT(2) = b = Background > 0.

Suggested Kpol Data Structure

In this section we describes a new KPOL data structure proposed in order to improve the information contained into the data file. The following table describes the suggestions. In particular we put in red color the fields that have to be discussed or verified.

Keyword	Present	Suggested	Comments	
FILE	'12_10_2007_9_12_25-data.dat'	'kpol.www.vvv.20071012.091225.dat'		
		Modify the filename of data files.		
		Take care that "	9" has to changes to "09".	
		Wavelength and	l Voltage info	
		www = 65	> wavelength 650 nm	
		$\mathbf{v}\mathbf{v}\mathbf{v} = 080$	> voltage 800 mV	
		vvv = 100	> voltage 1000 mV	
IOUT	cnt/gt	cnt		
IOUTERR	cnt/gt	cnt		
IIN	W	W		
IINERR	W	W		
DATE	None		Date of file generation or	
	N		modification	
ONUM	None	Integer	Unique identifier for this	
DIGTDUME	News	KDOL		
INSIKUME	None	RPOL DMT		
DETECTOR	None			
ORIGIN	None	INAF-OATO	Organization creating	
			data file of User for	
			data	
			uata.	
EXPTIME	None	S	Exposure time from log	
			to data file by reformat	
			code (a value for each	
			exposures or the same	
			value for the	
			observation)	
DARK	None	cnt	Dark count file:	
			"date/time" "darkvalue"	
			"exptime"	
CAL_FILE	None	TBD	Calibration file/files (e.g.	
			background values, see	
			also (*) Note	
CAL_PATH	None	TBD	Calibration file path dark	
			file	
LOG_FILE	None	'kpol.www.vvv.20071012.091225.log'	Log file	
LOG PATH	None	KPOL/DATA	Log file path	

Table 3: Proposed KPOL data structure

Kpol Data Processing and Analysis Software

A preliminary Graphical User Interface (GUI) of the KPOL Data Processing and Analysis software, Version 0.0, has been developed in Interactive Data Language (IDL) and released to the team on Oct 18, 2007. The code is Operating Systems (OS) independent, that is, it has been tested on Mac OSX, Linux and MS Windows OS.

The main features implemented are:

- (1) Read KPOL FITS files
- (2) Plot data time series
- (3) Plot the Photo-Diode data
- (4) Remove the Dark counts
- (5) Normalize the data
- (6) Perform sinusoidal fitting (see Eq 1)
- (7) Display fitting function
- (8) Save results on ASCII file

The following procedure allows the user to install the package from distributed compressed file *kpol.rar* and run the code:

- 1. Unpack the kpol.rar file
- 2. The following directories are created
 - i. IDL_MYLIB
 - ii. KPŌL
 - iii. LIB
- 3. Run IDL, compile the code and run the GUI
 - i. idl
 - *ii.* Working directory *KPOL/PRO/*
 - iii. Include IDL_MYLIB/ in the path
 - *iv.* @mn
 - v. KPOL_DDAS_MW

The following figure shows the main window of KPOL Data Processing and Analysis software.



Figure 1: main window of KPOL Data Processing and Analysis software (V0.0)