

## Summary of Updates to Cosmos v2 by Miguel Angel Gonzales

### **Cosmos v. 2.39 (30/07/2012)**

Based on Cosmos code from D17 (/home/cs/lambda/macros/D17/GENERAL/cosmos.pro).

#### *Modifications by MAG before May 2009:*

- Calculation Options: Introduce different choices for each angle.
- Added Figaro values so that both D17 and FIGARO data can be treated.
- Added reading of monitor (needed for FIGARO) and related arrays
- Added possibility of selecting a different detector range for each angle
- Added possibility of giving different values for the machine options for each angle
- Added possibility of using monitor when the direct beam has not been measured
- Added possibility of selecting a monitor run as direct beam (using m##### in Direct box)

#### *Modifications by MAG from May 2009:*

- 15/05/09: Added new anal\_factor routine from Bob Cubitt and changed format g10.4 --> g11.4 when writing AFT files.
- 25/05/09: Corrected bug in call to cosmos\_anal\_run (the last variable passed to cosmos\_anal\_run was always 1, so the code was using always the options defined for the first angle, even for angles 2 and 3)
- 08/06/09: Disabled warnings concerning small useful x-range. Added new gravity correction routine from Bob Cubitt. Modified text in machine options for d0. Modified text in calculation options for low res/statistics points.
- 08/07/09: Changed error calculation in cosmos\_anal\_run routines.
- 23/07/09: Added parameter slitsproduct used in D17 in order to normalize by the slits opening. This is needed if the direct and reflected beam have not been measured using the same slits values. To note that parameters S2X and S3X (param2[93] and param2[95]) seem to be wrong or at least they do not correspond to the slits widths s2w and s3w calculated as in LAMP as param2[8]+param2[9] and param2[12]+param2[13], which seem to be the correct values. So slits computed now in this way for D17.
- 01/09/09: Names of procedures and functions changed in order to avoid duplications and problems in the LAMP runtime code.
- 10/09/09: Corrected writing of AFT files.
- 13/10/09: Corrected small differences with Cosmos due to: 1. Typo error in an IF command: 'd17' --> 'D17', so the normalization by slitsproduct was skipped. 2. Different weighting scheme in anal\_mean: weightfactor = 1/dy^2 --> y/dy^2 & weightedmeanerr = 1/sqrt(sumweights) --> weightedmean\*sqrt(sumerrsq).
- 28/10/09: Added option refdown for FIGARO to determine if the configuration employed is reflection down instead of the standard one. If so the gravity correction for theta is done in the same way as the standard case, but the newtheta is varied on the opposite sense. Corrected also a bug that made that the newtheta calculated in cosmos\_grav was not employed in computing Q (angle\_bragg was used instead).
- 19/11/09: Changes in function cosmos\_anal\_log to remove only the negative points, but keep those where  $y < dy$ .

*Modifications by MAG from 2010 with the date, version number and instruments affected:*

Version & Date	Details	Instruments
<b>v. 2.21</b> (20/04/10)	Remove +1 from the error estimation in <code>cosmos_anal_run</code> , <code>cosmos_anal_run_nodirect</code> , <code>cosmos_anal_run_monitor</code> . Added printing of <code>poff</code> , <code>openangle</code> , <code>d0</code> and <code>pixelwidth</code> in dialogue window (constants used in calculating <code>lambda</code> ). No default values for <code>poff</code> , <code>openangle</code> , <code>d0</code> and <code>pixelwidth</code> (set to zero).	FIGARO & D17
<b>v. 2.22</b> (27/04/10)	Corrected bug in the output to the dialog window of the background ranges (direct and reflect were inverted).	FIGARO & D17
<b>v. 2.23</b> (15/06/10)	Added new file format used in D17 from June 2010. Data are not written in a single block, but using a TOF block per detector line.	D17
<b>v. 2.24</b> (21/06/10)	Detector format option modified because the new format for XY acquisitions have not changed, so the program crashed when trying to read a water file. Now <code>detector_format = 2</code> if the keyword '2' is in the second line of the <code>numor</code> file, but set back to 1 if the number of TOF channels = 1.	D17
<b>v. 2.25</b> (15/07/10)	Slight modification to the routine inserting the rows (added <code>alignment=2</code> and <code>/editable</code> keywords). Also added some lines to routine <code>cosmos_load_vars</code> , so that when the saved table is loaded the row labels are correctly shown.	FIGARO & D17
<b>v. 2.27</b> (11/09/10)	Modified writing of header of AFT files to avoid crashes due to IDL getting out of logical units. This happened when there was no reflected beam for the first angle. In that case the command. 'Results for reflect beam ' + <code>reflect1[0]</code> produced an error - as <code>reflect1[0]</code> is an integer = 0 and not a string - and the program continued without writing the <code>afit</code> file and without closing the logical unit).	FIGARO & D17
<b>v. 2.28</b> (29/10/10)	Corrected small bug that makes that table is not written. In <code>cosmos_save_vars</code> use <code>if save_lun gt 0 then free_lun,save_lun</code> instead of <code>if free_lun gt 0 then free_lun,save_lun</code> .	FIGARO & D17
<b>v. 2.30b</b> (29/10/10)	Added line <code>files = strtrim(string(files),2)</code> in <code>cosmos_raw_read</code> to avoid that the program gets stacked when a beam is missing and <code>files</code> is an integer = 0 instead of a string.	FIGARO & D17
<b>v. 2.33</b> (12/05/11)	Read sample offset position and use it in the gravity correction procedure. Added parameters <code>offset</code> , <code>slit3</code> , and <code>slit2</code> for this. And <code>cosmos_grav</code> routine changed in order to treat all the tof channels in one call and remove the do loop. Bug if some points are removed in the "tidy floating point errors" section, as then the number of points is not equal to the value of <code>result_size</code> calculated before. Furthermore there can be additional problems if in a kinetic run, the number of removed points changes from slice to the other. I try to correct this using the first slice as reference (to be checked with a real kinetic scan).	FIGARO & D17
<b>v. 2.34</b> (17/05/11)	Parameter indicating the sample offset position (figaro only) changed from <code>par1[24]</code> to <code>par1[23]</code> . Corrected bug in line 1550 <code>anal.searchy --&gt; anal.searchy3</code> .	FIGARO & D17

<b>v. 2.35</b> (20/06/11)	The chopper separation for D17 is read from the numor parameters instead of being hardcoded. Note that if the value written in the parameter file (par2[14]) is $\leq 0.0$ then the hardcoded value (85e-3) will be used. If the value written in par2[14] is $> 8.0$ , then it is multiplied by 0.01. Otherwise the value read is directly used. The chopper separation is written in the dialog window, under "Constants used in calculating wavelength resolution" and should be $\sim 0.08$ m for D17.	D17
<b>v. 2.36</b> (07/07/11)	The region defined to search for the peak is only applied to the reflected beam, not to the direct beam. For the latter the peak search is done over the full useful range of the detector. This is done to avoid problems when the peak positions are not the same for direct and reflect. In the future one could envisage to give the possibility of defining two different regions for direct and reflected beams.	FIGARO & D17
<b>v. 2.37</b> (30/11/11)	Calculation of wavelength resolution (care: bug in err_ray as a factor of 2 is missing)!!!! Angular resolution corrected. Interslit distance is read in for D17 now. Corrected the detector center for D17.	FIGARO & D17
<b>v. 2.38</b> (14/05/12)	Corrected bug on the analysis of kinetic runs. The background subtraction was only applied to the first slice. This has been corrected now in the routine cosmos_anal_run. The only modification was to put the calls to cosmos_anal_backgroundaverage and cosmos_anal_backgroundfit out of the "if islice eq 0 then begin ... endif" block. Note also that the cosmos_anal_run_nodirect and cosmos_anal_run_monitor routines cannot deal with kinetic scans	FIGARO & D17
<b>v. 2.39</b> (30/07/12)	Simply added a warning at start to indicate that this program is obsolete and new cosmos should be used instead.	FIGARO & D17

Please note that the new cosmos v3 was launched in June 2012 and it contains all updates in the software itself under 'news'. This document will therefore not be updated again.