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TORUS used to produce graphical output using internal PGPLOT calls, but these calls have now been removed in order to increase TORUS portability.

Plotting images

VTK files

Output of grid data for plotting may now be made using calls to `vtk_mod` subroutines, which produce VTK format files. VTK files produced by Torus on the fly include:

filename	Description
lucy.vtk	Overwritten with each Lucy iteration, contains crossings, deltat, dust1, etacont, etaline, fixedtemp, mesh_quality, rho, tau, and temperature.
bias.vtk	Contains: chiline, mesh_quality, and temperature.
beforesmooth.vtk	
aftersmooth.vtk	Contains: inflow, mesh_quality, rho, temperature, and velocity_magnitude.
rho.vtk	Contains: inflow, mesh_quality, rho, temperature, velocity_magnitude.

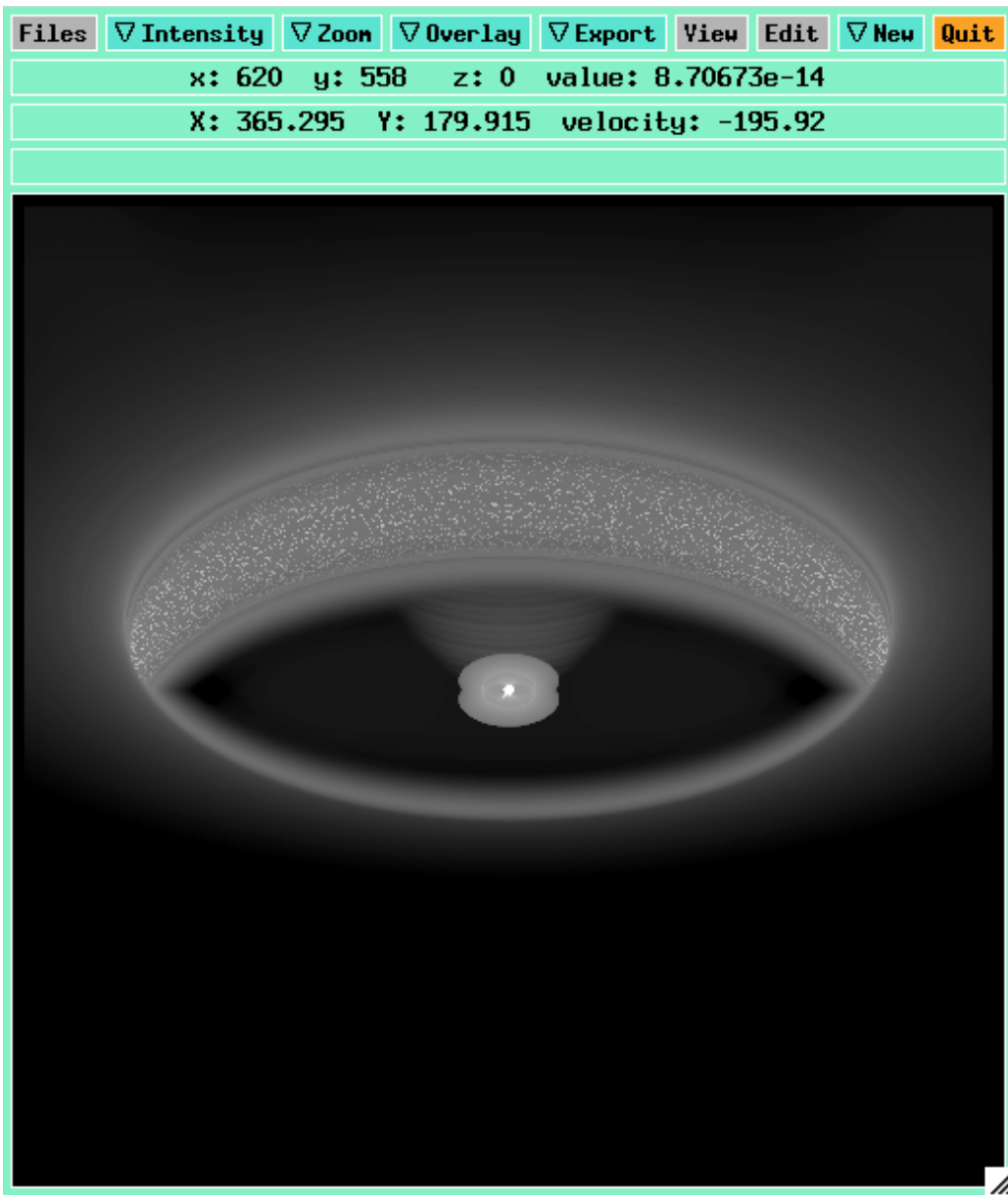
VTK files can be plotted with the Visit Visualization Tool. You may also like to try [paraview](#).

FITS images

See the Dust Continuum Models section (subsection "Calculating Images") for more information on how to produce image files. The [SAO DS9](#) GUI can be used to plot FITS files.

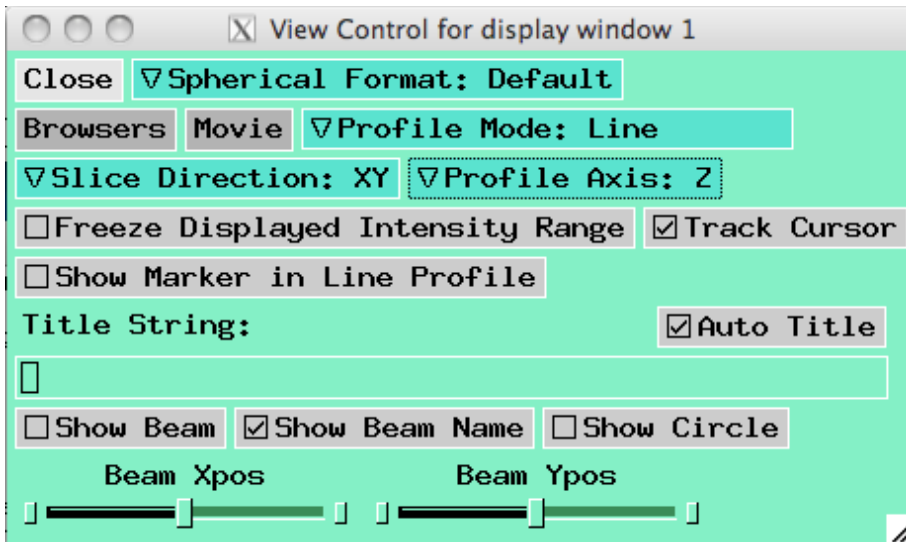
To view spectral line profiles, the program [kvis](#) handles data cubes (output as described in the atomic line transfer calculations section) effectively. The following is an example of the fits output of an atomic line transfer model run:

- [KvisScreenShot1?](#):



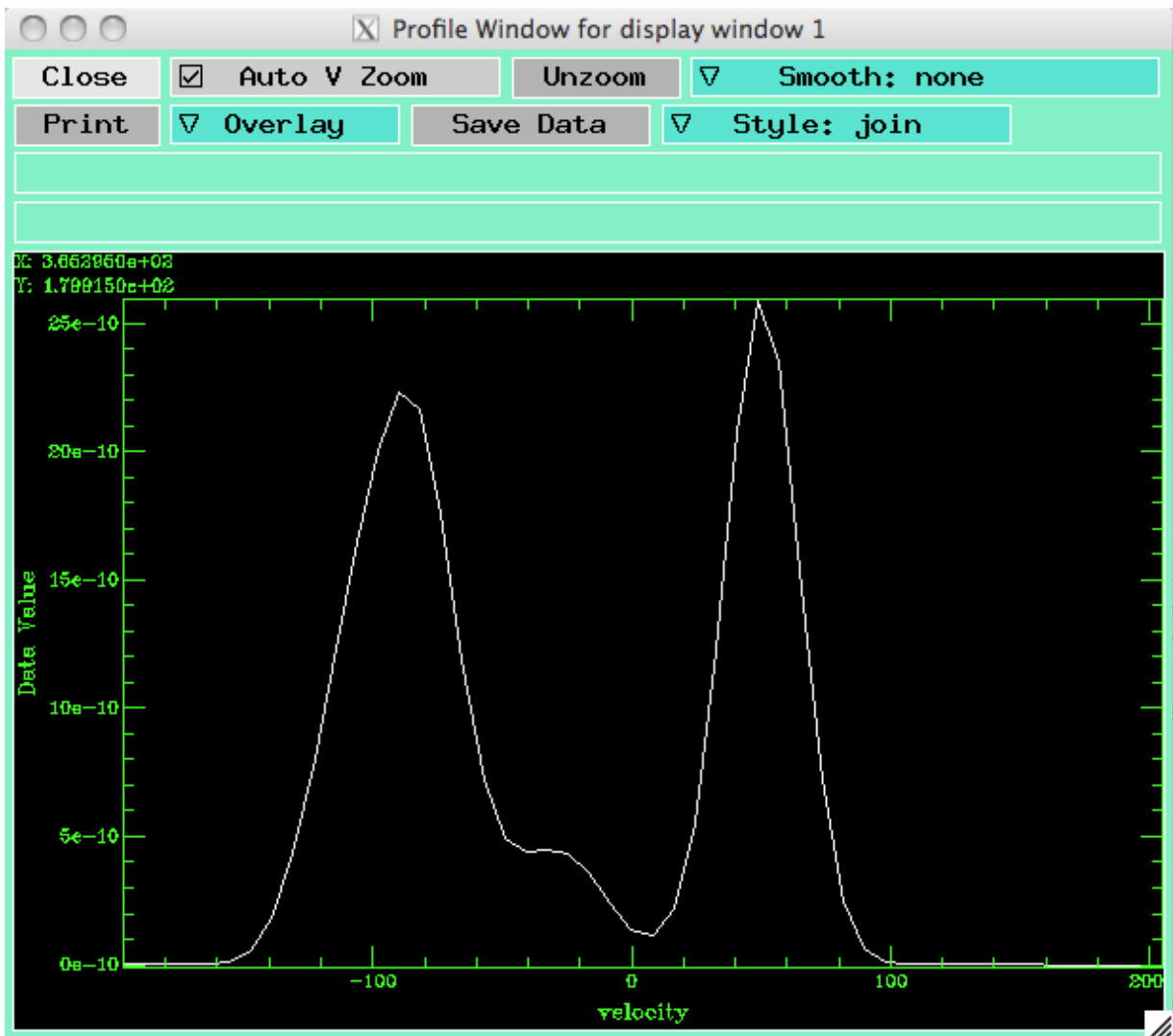
Clicking **View** will open this window:

- [KvisScreenShot2 ?](#):



Once **Profile Mode** is changed from "none" to any other option, a profile viewing window will pop up (see next image for example). To view spectral lines wherever your cursor is, choose "line" as the profile mode, and be sure the "track cursor" box is checked. As you move the mouse around the main display window, the line profile will auto-update in the profile window.

- [KvisScreenShot3 ?](#):



Auto V Zoom scales the intensity axis on the fly depending on where your cursor is; uncheck this (and click **Unzoom**) to fix the y axis display to the full range. To adjust the display settings in the profile window, click **Overlay** and select "axis labels." This box will pop up:

- [KvisScreenShot4 ?](#):



Once "enable" is checked, select display settings as desired.

Additional notes

- To generate a box average of the spectral line in a given region, change **Profile Mode** to "box average," and middle click-drag (alt+click-drag on macs) to define a rectangular region on the image. After a moment, the averaged line profile within your defined region will appear in the profile window.
- **kvis** can also generate movies- click **Movie** in the view control window. The default setting is for the X-Y plane to be the "slice direction," with the movie progressing through z values in the data cube (in our case, velocities).
- The scroll wheel on the mouse can be used to zoom in/out in the main display window, and control+left click-drag can be used to define a rectangular zoom area in the image.

Plotting spectral energy distributions

The creation of .dat files containing spectra is described [here](#) (subsection Calculating SEDs). SEDs can be plotted using IDL with relative ease (will attach sample code here soon).

-- [AliciaAarnio](#) - 26 Aug 2010

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