IVC

Interferometric Visibility Computations

An IDL software tool for interferometry simulations and model fitting

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IVC **is a software tool for computing the interferometric visibilities of a light source model and for matching these simulations with real observation data coming from sparse uv-coverage interferometers.**
It is designed to be user-friendly and to serve as a generic tool to perform interferometric computations for custom models on given instruments, or to test grid of models against interferometric observations and non-interferometric ones with a simultaneous fit.

IVC **can be used both as a Graphical User Interface (Fig.1), or as a Subroutine to be called from within the user's modelling code.**
It is written in IDL ("Interactive Data Language", by RSInc), but it can also be used without IDL by means of the free "IDL Virtual Machine".

IVC **main aspects:**

- **inputs user's 1D $I(r,\lambda)$ or 2D $I(x,y,\lambda)$ model geometry at various wavelenght;**
- **performs fitting of observed visibilities $V(u,v,\lambda)$ to a grid of user's models $V_i(u,v,\lambda)$;**
- **computes visibilities from within the user's code to perfrom simultaneous model fitting on different observables, e.g. a double fit on visibility and SED together.**

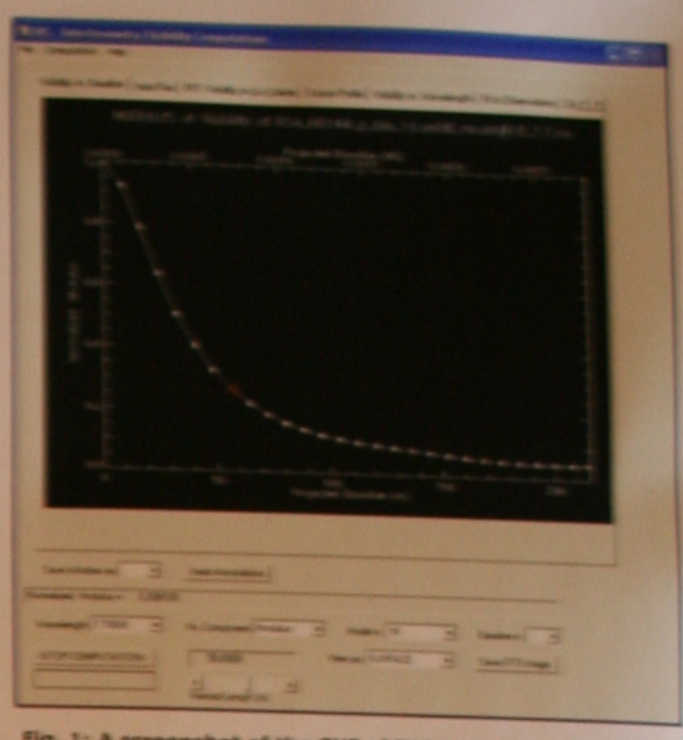

Fig. 1: A screenshot of the GUI of IVC

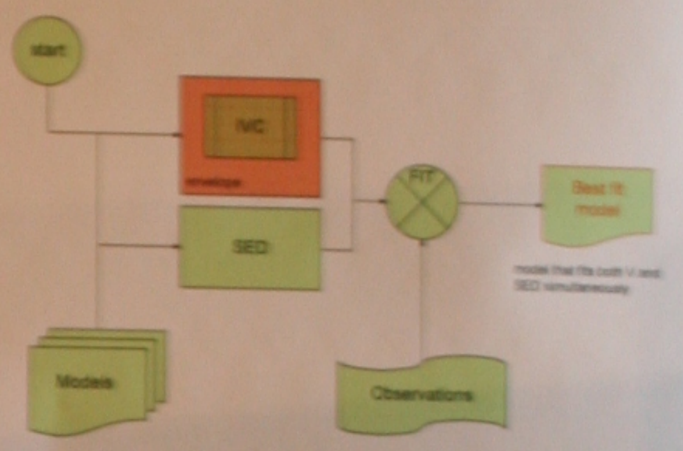

Fig. 2: Scheme of IVC Subroutine-mode usage to perform simultaneous fitting on interferometric and non-interferometric observational data.

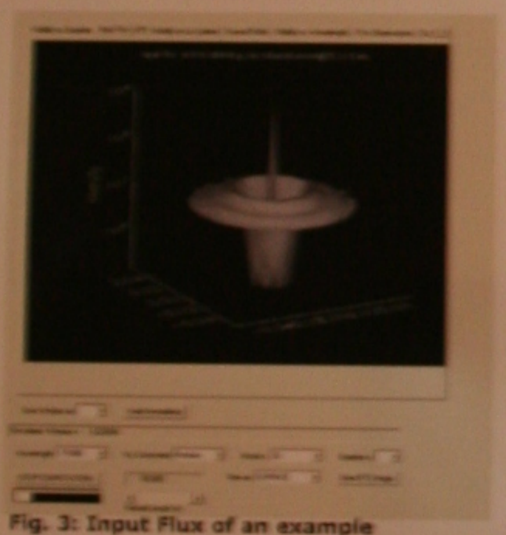

Fig. 3: Input Flux of an example spherical symmetric source (Model n.33) displayed as SURFACE (see "View as" drop list value).

Fig. 4: Visibility Modulus displayed as IMAGE

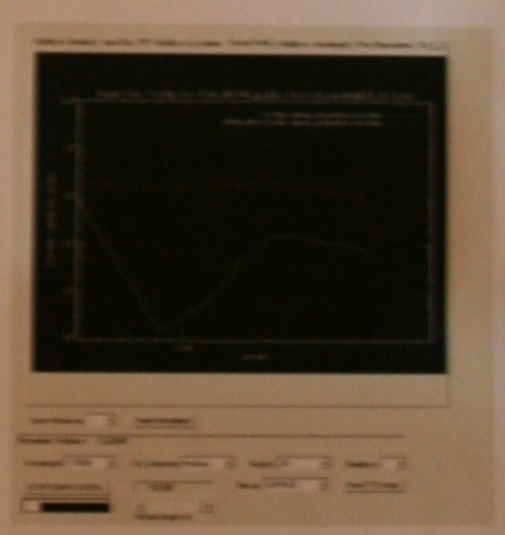

Fig. 5: Source Profile of Model n. 33 at 7.7 micron along baseline direction (white = section profile, red = integrated profile).

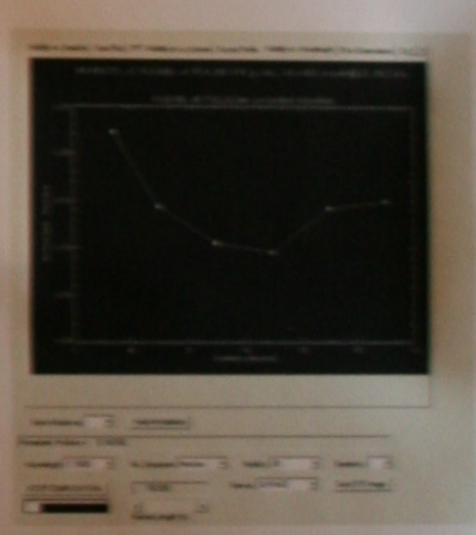

Fig. 6: Visibility Modulus at 100m projected baseline plotted vs. wavelength.

The various results of *IVC* computations are displayed in a set of tab widgets, showed here from Fig. 3 to Fig. 10. The GUI control bottons allow to browse across models, wavelengths, visibility component and so on, and all the outputs are correspondingly updated in real time. Figures 7 and 8 show a multi-baseline computation and Figures 9 and 10 display a model to observation χ^2 fit used to find the best fit model among the selected ones.

The *IVC* software is in its final stages of refinement and the current version is downloadable for free at the following internet address: http://www.mporzio.astro.it/~licausi/IVC/.

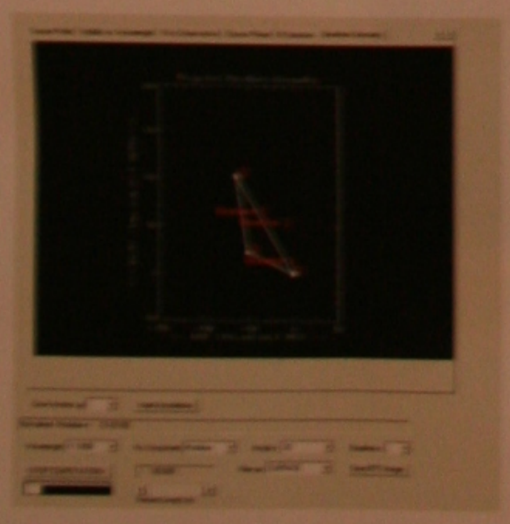

Fig. 7: Geometry of the three baselines projected on the sky: it is very useful to over-impose this plot on an image of the target in order to check the baselines directions respect to target's features.

Fig. 8: Closure Phase for the three baselines plotted vs. wavelength: here the closure phase is always zero, since Model n. 33 is point-symmetric.

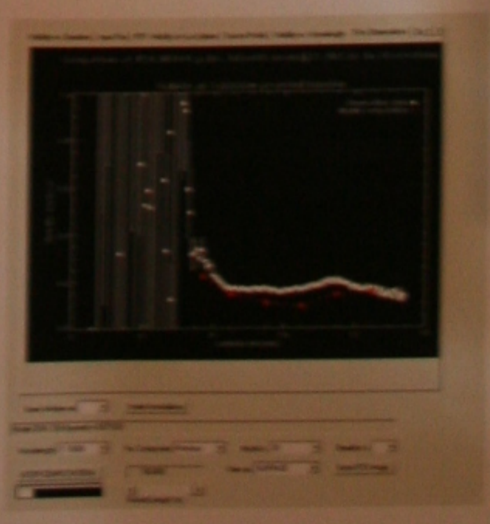

Fig. 9: Visibility Modulus at 100m projected baseline vs. wavelength compared to Observation data

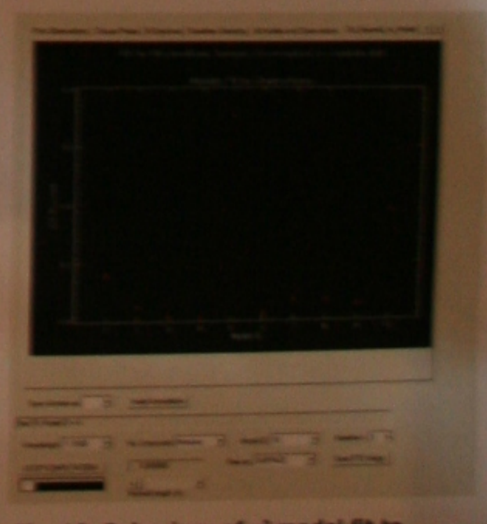

Fig. 10: Behaviour of χ^2 model fit to observations vs. Model ID