

# myXCLASS for CASA & VAMDC

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Spectroscopic data as it is accessible via VAMDC is essential to model and analyze astronomical spectra. VAMDC has supported the development of a toolbox (1) for the Common Astronomy Software Applications package (CASA) in order to include access to its databases. The toolbox contains the myXCLASS program, which is used to model astronomical spectra by solving the radiative transfer equation for an isothermal object in one dimension, whereas the finite source size and dust attenuation are considered as well.

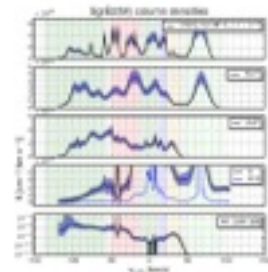
(1) <http://www.astro.uni-koeln.de/projects/schilke/myXCLASSInterface>

The spectroscopic data, such as transition frequencies, state energies, Einstein A coefficients, degeneracies and partition functions, required for the modeling, is retrieved via the VAMDC infrastructure from the CDMS and the JPL catalog and stored in a local database. Besides the access to the

databases, the toolbox also includes the model optimizer package MAGIX (2) (Modeling and Analysis Generic Interface for eXternal numeric codes). This optimizer helps to find the best description of the data using a certain model, i.e., finding the parameter set that most closely reproduces the data.

(2) Möller et al. A&A, 549, A21 (2013)

A recent examples, where the toolbox has been successfully used, is the analysis of spectra recorded towards the Sgr B2(M) cloud core which exhibit strong absorption features of gas located in the spiral arms of our galaxy. One of these spectra is shown in the Figure above. It shows a spectrum of  $36\text{ArH}^+$  (1-0) (blue) recorded towards the star forming region SrgB2(M). The optimizer has been used to fit the spectrum (red) and to derive column densities and excitation temperatures as a function of relative velocity of the molecular gas. The derived column density per velocity as shown in the right hand side figure for the above example including other species (3) provides important insights into the physical, chemical and structural composition of these objects.



(3) Schilke et al., ArXiv e-prints, 1403.7902 (2014)

## Support to access VAMDC Databases

You can implement protocols that VAMDC has designed:  
<http://www.vamdc.eu/standards>.

You might want to save time and to use our libraries in Java or other languages: <http://www.vamdc.eu/software>.

You may need some tutorials: see <http://tutorial.vamdc.org>.

You may need some help: send a mail to [support@vamdc.eu](mailto:support@vamdc.eu).

You may want to exchange: <http://forum.vamdc.org>

