

# POLLUX : a database of stellar spectra

## First step : SED and High Resolution Synthetic Spectra

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POLLUX is a stellar spectra database under development at the GRAAL laboratory (Montpellier, France), that will soon be made available online to the community through a VO compliant interface (<http://pollux.graal.univ-montp2.fr>).

The theoretical axis will be the first to be accessible, and POLLUX will propose high resolution synthetic spectra and spectral energy distribution

As a second step, the observational axis will be developed with a science ready format. It will propose access to spectra of standard stars, collected using different instruments (échelle spectrographs) available to the french astronomical community.

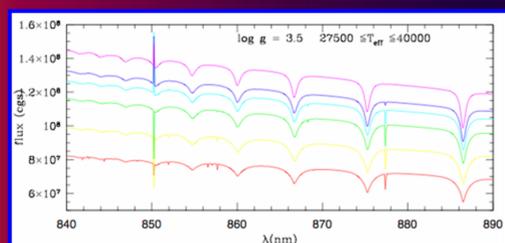
### Theoretical Data

Computed data for stellar spectral types from O to M at several metallicities, using :

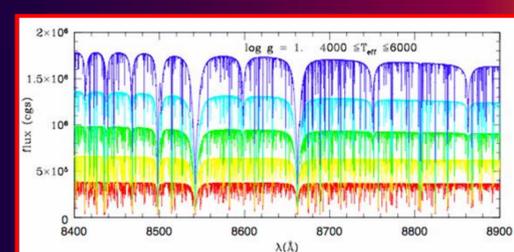
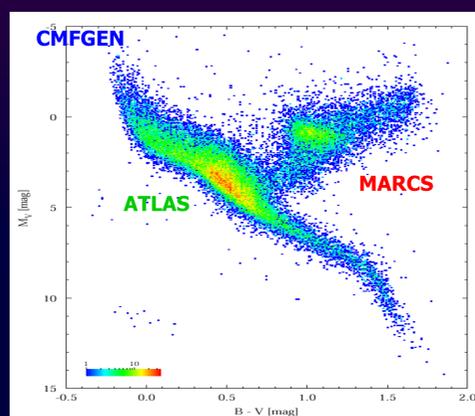
- the best available models of atmosphere (CMFGEN, ATLAS and MARCS)
- performant spectral synthesis codes (CMF\_FLUX,SYNSPEC and TURBOSPECTRUM)
- atomic linelists from VALD database and specific molecular linelists for cool stars

High resolution synthetic spectra

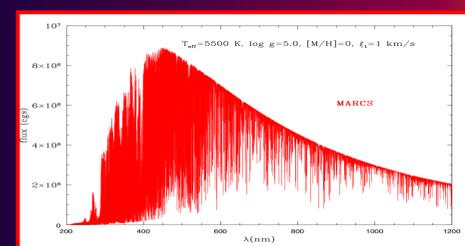
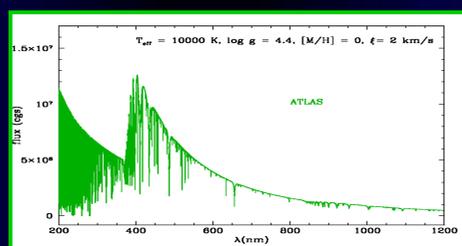
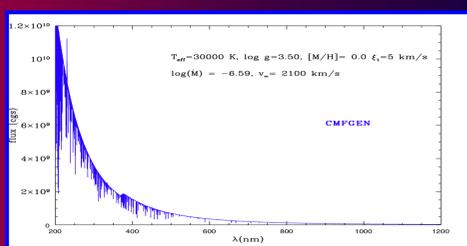
- computed from 300 nm to 1200nm at spectral resolution  $R = 150000$
- normalised to the continuum or displayed in absolute flux
- colour-magnitude diagram coverage in  $T_{\text{eff}}$ ,  $\log g$ ,  $[\text{Fe}/\text{H}] + [\alpha/\text{Fe}]$ , CNO



Blow-up in the GAIA RVS wavelength domain of the synthetic spectrum of an early-type star from the POLLUX data base



Blow-up in the GAIA RVS wavelength domain of the synthetic spectrum of a late-type star from the POLLUX database



Spectral Energy Distributions presented over the entire wavelength domain for a typical star in the spectral domain covered respectively by the CMFGEN (left), ATLAS (center) and MARCS (right) codes

Stay tuned and visit the POLLUX webpage at <http://pollux.graal.univ-montp2.fr>

### The POLLUX Database

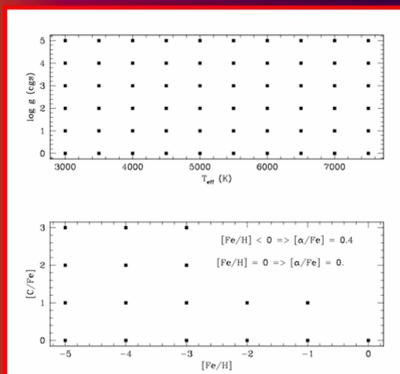
The POLLUX database will be available through a webpage regrouping a detailed documentation, a retrieval interface for the spectra and SEDs, and several science ready applications.

A header file is attached to each synthetic spectrum and SED, which contains a set of descriptors of characteristics common to observed and computed data (physical parameters characterizing the spectrum and SED) plus specific information for synthetic data (code, input physics, ...). This header file is designed to be VO compliant.

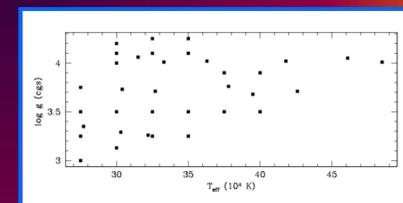
A query form allows to :

- retrieve data in VOTable format
- build a library
- visualise the entire spectrum/SED or portions of it and retrieve the images
- on-the-flight convolution of synthetic spectra (rotation profile, gaussian, ...)

The POLLUX database is also designed to serve automatic determination of stellar parameters. This can be done combining the synthetic spectra in POLLUX with observed data and using automated procedures for abundance determination. A project of this nature is already under development for the data in the EsPaDonS/NARVAL archive, using the MATISSE software.



Representation in the ( $T_{\text{eff}}$ ,  $\log g$ ) and the ( $[\text{Fe}/\text{H}]$ ,  $[\text{C}/\text{Fe}]$ ) planes of the grid of high resolution synthetic spectra and SEDs computed for late-type stars with the MARCS/TURBOSPECTRUM codes.



Grid of high resolution synthetic spectra and SEDs computed for O and B stars with the CMFGEN code, represented in the ( $T_{\text{eff}}$ ,  $\log g$ ) plane.

The empty region on the lower right part of the domain corresponds to a region of this plane where no stars can be found.