GALEV evolutionary synthesis models on the web

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GALEV evolutionary synthesis models describe the evolution of stellar populations in general, of star clusters as well as of galaxies, both in terms of resolved stellar populations and of integrated light properties over cosmological timescales of > 13 Gyr from the onset of star formation shortly after the Big Bang until today.

For galaxies, GALEV includes a simultaneous treatment of the chemical evolution of the gas and the spectral evolution of the stellar content, allowing for what we call a chemically consistent treatment: We use input physics (stellar evolutionary tracks, stellar yields and model atmospheres) for a large range of metallicities and consistently account for the increasing initial abundances of successive stellar generations.

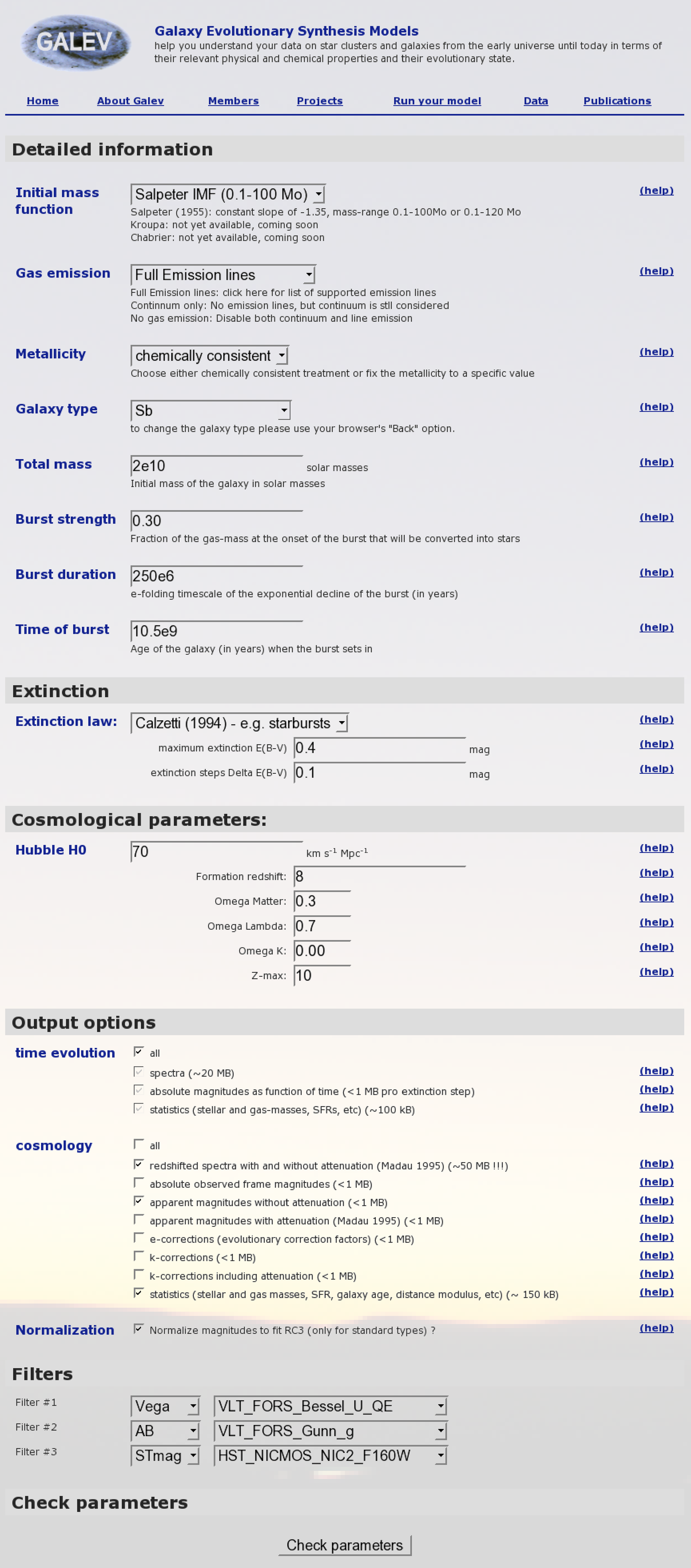
Here we present the latest version of the GALEV evolutionary synthesis models that are now interactively available at **http://www.galev.org**.

Introduction: Aim of GALEV

GALEV evolutionary synthesis models aim at describing the spectral and chemical evolution of stellar populations. Using only a minimum of input parameters (Star Formation History and Initial Mass Function) we are able to reproduce a wealth of physical parameters such as spectra, colours, star formation rates, stellar and gaseous masses, mass-to-light ratios and metallicities for a wide range of galaxy types.

This holds true not only for local galaxies, but also for younger galaxies at high redshifts.

The web-interface



Available parameters to specify your galaxy

- We offer a selection of the most frequently used **Initial Mass Functions** (IMFs): Salpeter and Kroupa
- **Gaseous emission** can be switched off or on, and contains line and/or continuum emission.
- The **metallicity** can be fixed or set to chemically consistent.

To describe galaxies you specify:

- **Galaxy mass**
- **Galaxy type**: We offer
  - Simple Stellar Populations (SSPs)
  - standard spectral types E . . . Sd,
  - exponentially declining SFRs,
  - SFRs proportional to the gas-mass,
  - constant SFRs, and
  - user-defined SFHs for which the user specifies the SFR at each time.
- **Starbursts** or **Truncation of star formation** scenarios can be added to all galaxy types.

To describe observations you can specify:

- **Extinction** We offer the following extinction-laws:
  - Calzetti for starburst galaxies
  - Cardelli for more quiescent galaxies
- **Cosmological models** can be specified via:
  - Hubble constant H_0
  - Energy density Ω_M and Ω_Λ
  - Formation redshift
- **Filter sets** are required to compute magnitudes in the Vega-, AB- or ST-system; most common filters are readily available, further filters can easily be added upon request.

For large model grids:

GALEV offers a **batch-mode**, allowing you to run a large number of models in one go.

Output options

Direct output from GALEV

- Integrated **spectra and magnitudes** as function of time
- **Stellar and gaseous masses**
- **Star formation rates** and
- ISM **metallicities**
- Luminosity- and mass-weighted ages and stellar metallicities

Combined with a cosmological model:

All outputs by default include attenuation due to intergalactic hydrogen (can be turned off)

- **Redshifted spectra**
- Absolute and apparent **magnitudes**
- **Restframe magnitudes** and colours
- Cosmological **k-corrections**
- Evolutionary **e-corrections**

If extinction was specified:

- All above parameters for each extinction step

Upcoming features of the web-interface

New input physics

- Extended isochrone sets, including effects of binary evolution
- Further and/or higher resolution spectral libraries
- User-defined IMF shapes (only for SSPs)
- Detailed treatment of the stochastic nature of intergalactic attenuation.

New output options

- Stellar absorption features, e.g. Lick indices
- Colour magnitude diagrams
- Detailed chemical abundances

These will be continually updated and upgraded, so **stay tuned!**

Further information

Kotulla et al. (2009, MNRAS 396, 462)
Anders et al. 2009a,b (in prep)