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First consistent Lyα profile and UV spectral modeling of $z \sim 3$ LGBs with a 3D radiative transfer code

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Abstract. We developped a 3D Monte Carlo Lyα radiation transfer code to understand the diversity of Lyα line profiles observed in star forming galaxies and related objects (Verhamme *et al.* 2006). Our code allows for prescribed arbitrary hydrogen density, ionisation, temperature structures, and dust distributions, and arbitrary velocity fields and UV photon sources.Here we present results from the first modelling of the Lyα line and of the UV spectrum with our code of a sample of $z \sim 3$ Lyman break galaxies observed by Steidel and collaborators (Pettini *et al.* 2002) and taken from the FORS Deep Field (Tapken *et al.* 2006). A simple model of an expanding neutral shell surrounding a starburst region can reproduce the whole variety of spectra ranging from double-peaked profiles to asymetric emission lines, P-Cygni profiles or broad absorption. The main determining parameters are the outflow velocity and the dust content. Other parameters such as the hydrogen column density, the intrinsic Lyα emission and hence SFR, and the intrinsic Lyα line widths can be determined consistently taking all radiation transfer effects into account.

Keywords. Galaxies: starburst – Galaxies: ISM – Galaxies: high-redshift – Ultraviolet: galaxies – Radiative transfer – Line: profiles

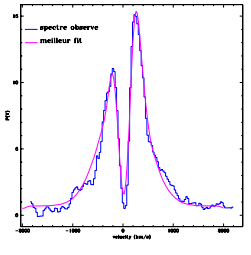

Figure 1. Best fit of the galaxie FDF-4691 with our code : a characteristic double-peaked profile.

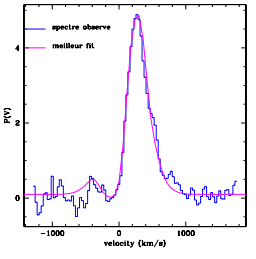

Figure 2. Best fit of the galaxie FDF-4691 with our code : a characteristic asymetric emission profile.

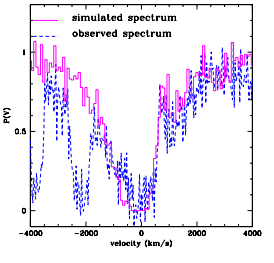

Figure 3. Best fit of the LBG MS 1512-cB58 : a broad absorption plus a small emission peak.

References

Pettini *et al.* 2002, *ApJ* 569, 742
Tapken *et al.* 2006, *A&A* in press
Verhamme *et al.* 2006, *A&A* in press, astro-ph/0608075