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INFLUENCE OF GALAXY ROTATION AND OUTFLOWS ON THE LYMAN ALPHA SPECTRAL LINE

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In this talk we show the influence of rotation and outflows of Lyman Alpha Emitters (LAEs) galaxies in their spectrum. We create a new model of LAE that consists of a spherical homogeneus distribution of Hydrogen atoms undergoing a solid body rotation and a radial expansion due to outflows. We generate the galaxy's Lyman Alpha (Lyα) emission line using radiative transfer simulations based on its motion dynamics. Finally, we analyze the morpholgy of the line and the implications it might have on the estimations of LAEs' physical parameters.

Galaxies detected through their distinctive Lyα emission are known as Lyman Alpha Emitters (LAEs). Typical LAEs are star-forming and have a low dust content. Additional dynamical characteristics of a LAEs' insterstellar medium can be derived by studying its Lyα line morphology and comparing it against theoretical models.

A new LAE model. In this work we create a new LAE model that considers the galaxy as a spherical distribution of Hydrogen atoms. It combines the effect of bulk rotation and outflows in the form of solid body rotation and radial expansion. So our model can be parametrized by 4 variables: rotation velocity $v_{\rm rot}$, outflow velocity $v_{\rm out}$, optical depth τ and viewing angle θ. Where τ represents the number of H atoms in the galaxy and θ represents the angle at which the observer can detect the photons that escaped the galaxy.

Simulation. We include these dynamical effects into a modified version of a Monte Carlo radiative transfer code called CLARA. This in order to study the parameters' impact into the the Lyα line morphology.

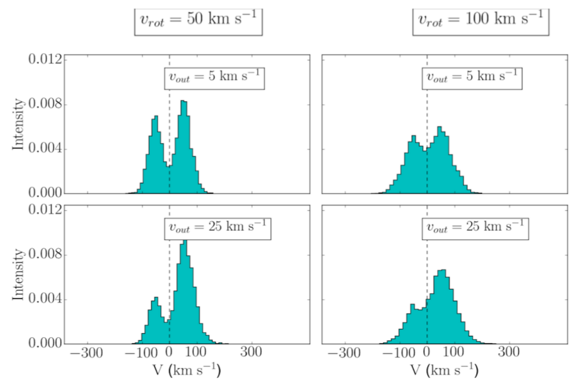

Fig. 1. Resulting simulated spectra for $\tau = 10^5$ and $\theta = 90^\circ$.

Results. We find that rotation alone does have an impact on the Lyα morphology. However, together with the outflows, the new model can reproduce double peak asymmetry in the line and can induce a Doppler shift shift in the rotation only spectrum. We are able to reproduce LAEs' main observed features with physically motivated parameters for the rotational and outflow velocities. We present fits of this model to some observational spectra to argue that both rotation and outflows have to be taken into account for a proper estimation of a LAE's physical parameters.

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