

A Dust-Poor Primeval Starburst Galaxy at $z=5.190$

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P-Cygni type Ly α profiles exhibited in nearly half of starburst galaxies, both nearby and high- z , are believed to be formed by an expanding supershell surrounding a star-forming region. By using a Monte Carlo method, we investigated the Ly line formation by an expanding supershell. We find that the number and the flux ratios of emission peaks is determined by interplay of τ_{0} and V_{exp} of the supershell. The detailed mechanism of radiative transfer is also pursued to understand the basic processes involved with these results. It is noticeable that emission peaks of higher order are prone to dust extinction. Moreover the spatial distribution of dust around the expanding supershell also plays a very crucial role in the extinction of higher order peak. We apply the results to provide a new interpretation on the Ly α profile of a very remote starburst galaxy ES1 at $z=5.190$. This galaxy has Ly α emission which can be decomposed into an asymmetric narrow emission and a hump at the red wing of the narrow emission. A simple modelling and an analytic calculation give us the expansion velocity $V_{\text{exp}} = 280 \text{ km s}^{-1}$, and the column density of the supershell $N_{\text{HI}} = 10^{20} \text{ cm}^{-2}$. Moreover, the presence of hump indicates that the supershell contains little dust, because those hump is very prone to dust extinction.