
Single-peak P-Cygni type Ly α and the spatial distribution of
dust in Star-forming regions

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The formation of P-Cygni type Ly α emission in dusty star-forming regions of starburst galaxies is investigated. We assume that the star-forming regions are completely covered by an expanding supershell of neutral hydrogen, whose column density and expansion velocity are about 10^{20} cm⁻² and a few hundred km s⁻¹, respectively. The escape of Ly α photons from the supershell is achieved by a number of back-scatterings. Hence, in the case of dustless supershell, a series of emission peaks appear at the red-wing of the emergent profile. However, observations have shown that single-peak Ly α emission is overwhelming in number. In this paper, we find that, in order to reconcile with the observations, the dust shell should be more extended into the bubble than the neutral supershell. We also emphasize that kinematic information, imprinted on the Ly α emergent profiles, is conserved even in dusty cases. With these results in mind, we discuss on the possible mechanism of formation of dust cavity, and also on the reasonable interpretation of spectroscopic data to estimate both the mass and the dust abundance of the high-redshift galaxies including the Lyman Break galaxies.