HI Lyman-alpha equivalent widths of stellar populations

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We have compiled a library of stellar lya equivalent widths in O and B stars using the model atmosphere codes cgen and tlus, respectively. The equivalent widths range from about 0 to 30 AA in absorption for early-O to mid-B stars. The purpose of this library is the prediction of the underlying stellar lya absorption in stellar populations of star-forming galaxies with nebular lya emission. We implemented the grid of individual equivalent widths into the Starburst99 population synthesis code to generate synthetic lya equivalent widths for representative star-formation histories. A starburst observed after 10 Myr will produce a stellar lya line with an equivalent width of ~ -10pm4 AA in absorption for a Salpeter initial mass function. The lower value (deeper absorption) results for an instantaneous burst, and the higher value (shallower line) for continuous star formation. Depending on the escape fraction of nebular lya photons, the effect of stellar lya on the total profile ranges from negligible to dominant. If the nebular escape fraction is 10%, the stellar absorption and nebular emission equivalent widths become comparable for continuous star formation at ages of 10 to 20 Myr.

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