

[KGC-35] The Effect of Massive Neutrinos on the Merging Rates of the First Objects

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We study the effect of massive neutrinos on the evolution of the early mini-halos ($M \sim 10^6 h^{-1} M_{\odot}$ at $z \sim 20$) where the first stars may have formed. In the framework of the extended Press-Schechter formalism, we evaluate analytically the rates of merging of the mini-halos into zero-dimensional larger halos and one-dimensional mini-filaments. It is shown that the halo-to-filament merging rate increases with the neutrino mass fraction f_{ν} while the halo-to-halo merging rate decreases. Comparing the cases of $f_{\nu}=0$ and 0.10, the halo-to-filament merging rate for $f_{\nu}=0.10$ is 3 times larger than the other. The distribution of the epochs of the longest-axis collapse of these first filaments is also derived and found to reach a sharp maximum at $z \sim 8-9$. Once the first mini-filaments form, they would provide bridges along which the matter and gas more rapidly accrete onto the constituent halos, causing the early formation of the first galaxies and rapid growth of their central blackholes. Furthermore, the longest axis collapse of these first mini-filaments would spur the supermassive blackholes to power the ultra-luminous high- z quasars.
