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String Gas Cosmology with Varying Speed of Light

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Some years ago in the context of a mechanism that thermally generates the primordial perturbations through a Hagedorn phase of string cosmology (Nayeri-Brandenberger-Vafa (NBV) setup) a blue tensor tilt with an induced and complimentary red tilt to the scalar spectrum, with a naturally large tensor to scalar ratio that relates to both, was found. One of the shortcomings of this setup, however, is assuming a universe, which is flat and big enough to account for the present size of the current observable universe. To fix this issue, the constancy of speed of light during the Hagedorn phase only is being relaxed and assumed to be the function of the running dilatonic field in that era. By the end of the Hagedorn epoch the speed of light is fixed and the universe transits to the radiation dominated long before Nucleosynthesis. This ansatz solves the so called flatness problem of the string gas cosmology in the NBV setup.

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