Baryon acoustic oscillations in a non-flat universe

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Abstract

In this Bachelor's Thesis we make use of high performance computing and data analysis tools to study the effects of slight variations in the Standard Cosmological model, the Λ Cold Dark Matter (ΛCDM) model. This model assumes a spatially flat universe, though the observations are compatible with a nonzero value of the curvature parameter Ω_k. This work is based off the Baryon Acoustic Oscillations, a phenomenon that allows us to study the behavior of the universe in its earliest stages (the first 380.000 of its 13.8 billion years of lifetime – a 0.003% of the Universe's lifetime!). These oscillations shape the large scale structure of the universe, and more importantly, set a 'cosmic ruler' r_d with respect to which is used to measure cosmological distances, such as the Hubble distance D_H and angular diameter distance D_M. After analyzing the *extended Baryon Oscillation Spectroscopic Survey* galaxy catalogue, we achieve the following results: $D_H/r_d = 18.66 \pm 0.72$ y $D_M/r_d = 18.28 \pm 0.53$ for a flat universe, in concordance to the results for other nonzero values of the curvature

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parameter Ω_k (up to a 20% of the total density), and more importantly with previous results in the field.

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Big Bang?

BAO

ΛCDM

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References

[1] Ajit Kumar Sahoo, Vaishnavi Kompally, and Siba K Udgata.
Wi-fi sensing based real-time activity detection in smart home environment.
In *2023 IEEE Applied Sensing Conference (APSCON)*, pages 1–3, 2023.

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Thank You