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Bianchi Cosmological Model with Quadratic Equation of State

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Recent discoveries regarding the existence of the large-scale structures in the universe, especially on the scales where the Cosmological Principle is expected to be accurate, pose a challenge to the Standard Model of Cosmology (Λ CDM model). These structures extend beyond 200 –300 Mpc (Haines, Clowes, and Campusano, 2000; Gott III et al., 2005; Clowes et al., 2013; Horváth, Hakkila, and Bagoly, 2014, Lopez et al., 2021) provide strong evidence of anisotropy against the Λ CDM model as there should not be clumping of objects within that scale. The work of Migkas et al. (2020, 2021) also observed a similar anisotropic behavior of galaxy clusters towards a particular direction in the night sky. However, there is still no clear explanation for how to explain these observations. From this, the researcher aims to describe these anisotropies and their nature by viewing them through a theoretical lens.

Authors: RAQUEL, Bjorn Jasper (Rizal Technological University); Mr SAPALARAN, Willie Anthony (Rizal Technological University); Dr JIRKOVSKY, Ludek (Institute of Business and Technology)

Presenter: RAQUEL, Bjorn Jasper (Rizal Technological University)

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