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Structure formation in an anisotropic universe

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In this work, we investigate the growth of cosmological perturbations within a cosmological scenario where the early universe is dominated by dark matter and gradually becomes anisotropic at later times due to the presence of a small shear tensor associated with dark energy. To describe this, we employ the Bianchi I metric, which characterizes a spacetime background that is homogeneous but anisotropic. The equations of motion for a dark matter fluid are derived and solved both at linear and non-linear orders. This study is performed using a constant equation of state for the dark energy component and a time-dependent rate of anisotropic expansion.

Authors: VALENZUELA-TOLEDO, Cesar A. (Departamento de Física, Universidad del Valle); VALENCIA ZUÑIGA, GABRIELA ALEJANDRA (Universidad del Valle); Dr MOTOA-MANZANO, Josué (Universidad del Valle)

Presenter: VALENCIA ZUÑIGA, GABRIELA ALEJANDRA (Universidad del Valle)