Cosmological models based on the Kerr-Schild Gravity and analogues with Microworld

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Abstract: The Kerr-Schild (KS) geometry is considered as a base for cosmological models. Although, the KS geometry is rigidly related with an auxiliary Minkowski background, it can describe very different types of the models, starting from the models of elementary particles and black holes, and up to different cosmological models [1]. In particular, it represents the de Sitter, anti-de Sitter, flat and diverse bubble models with and without rotation, and also the combined models, such as de Sitter (or anti-se Sitter) embedded into an external flat or curved spacetime and so on. In microworld the KS geometry describes a twistor structure of the vacuum fluctuations [2] and consistent with gravity bubble model of spinning particle [3]. In particular, the exact KS solutions show that the elementary electromagnetic excitations have a specific form of the lightlike twistor-beams [4], representing a generalization of the well known pp-wave solutions. Following to Wheeler's estimations we take into account the great density of vacuum fluctuations and arrive at the general conclusion that Universe should have a flat cosmological background, supporting the more natural model of a cold and flat Universe. It contradicts to predominant doctrine of the Big Bang and expanding Universe, and enforces to return to an 'effective geometry' describing the background radiation originating from the energy lost by photons [5]. Discussing the problem of gravitational contribution to the mass and energy [1], we emphasize that the conception of mass is well defined only in the asymptotically flat spacetimes. Finally, we discuss a volume Casimir effect [6] and show that matter of the island systems collapsing into a superdense state turns in some pseudovacuum state, which reproduces properties of dark matter.

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