

Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Beyond the Isotropic Lifshitz Endpoint – Antiscreening, Dark Matter, Cosmic Evolution TIEN CHANG, Massachusetts Institute of Technology MIT — We consider symmetry breakings beyond the admissible range of isotropic Lifshitz fixed points in renormalization-group calculations. Such phenomenon is akin to the well-known result of tricritical-tricoexistence effect of phase transitions. The isotropic Lifshitz endpoint (ILE) is the critical point of the statistically isotropic multiphase coexisting states of subdomains of anisotropic helicoidal and non-helicoidal neighborhoods. An example of cosmic evolution based on the effective action with scale-running gravitational and cosmological constants at large spatial scales is considered. The gravitational symmetry-breaking effects at intermediate (e.g., galactic) scales are related to the development and formation of cosmic structures with multifractal, antiscreening and dark matter effects. At very large cosmological scales, the FLRW formalism leads to the understanding of statistically isotropic multi-phase coexisting states. We presently live in a matter-dominated statistically isotropic and homogeneous fractal Universe far beyond the ILE. The result provides a natural explanation for the accelerating cosmic expansion and coincidence problem.

Tien Chang
Massachusetts Institute of Technology MIT

Date submitted: 12 Jan 2020

Electronic form version 1.4