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"Is Our Universe the Remnant of Chiral Anomaly in Inflation?"

Modern cosmology has been remarkably successful in describing the universe from a second after the Big Bang until today. However, its physics before that time is still much less certain. It profoundly involves particle theory beyond the Standard Model to explain long-standing puzzles: the origin of the observed matter asymmetry, nature of dark matter, massive neutrinos, and cosmic inflation. In this talk, I will explain that a new framework based on embedding axion-inflation in left-right symmetric gauge extensions of the SM can possibly solve and relate these seemingly unrelated mysteries of modern cosmology. The baryon asymmetry and dark matter today are remnants of a pure quantum effect (chiral anomaly) in inflation which is the source of CP violation in inflation. As a smoking gun, this setup has robust observable signatures for the GW background to be probed by future CMB missions and laser interferometer detectors.

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