Contribution ID: **110** Type: **not specified**

Geometry from probability: A possible origin of dark energy or the inflaton

A principle is proposed that relates probability to geometry. That principle is then used to motivate the introduction of nonlinear differential operators on spacetime manifolds. Such operators are difficult to handle mathematically, hence a geometric interpretation of the Universal Covering Group for tensors is undertaken. The principle can then be understood as equivalent to a Lagrangian of classical and quantum fields. Taking a subalgebra based on geometric objects formed of direct sums of scalar and vector fields, it is possible to define the analog of the metric and curvature. Unlike the old Kaluza-Klein theory, which it resembles, the fiber bundle structure is isomorphic to that of ordinary four dimen- sional spacetime, and the fields are dependent on only four dimensions. Using the dynamics of particles responding to the extended metric, it's possible to read off the non-zero equivalent of Cristoffel symbols from the equation of motion. It turns out that a simple set of constraints on the standard Klein-Gordon Cristoffel symbols yield the same results. The equivalent Ricci tensor of this geometry yields vacuum general relativity and electromagnetism, as well as a Klein-Gordon-like quantum field. With a generalization of the stress-energy tensor, an exact solution for a plane-symmetric dust can be found where the scalar portion of the field drives early universe inflation, levels off for a period, then causes later enhanced universal acceleration. That suggests that some version of this theory may be of utility in modeling the effects of the inflaton or dark energy.

Summary

This work develops a new geometry that is a simple extension of standard tensor analysis, applying it to create a Kaluza-Klein-like theory. An exact cosmological solution for a plane-symmetric dust gives a dynamic universe with early inflation and later accelerated expansion.

Author: Dr VUILLE, Chris (Embry-Riddle Aeronautical University)

Presenter: Dr VUILLE, Chris (Embry-Riddle Aeronautical University)

Track Classification: Aug/6