Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Geometric Implications of Maxwell's Equations FELIX T. SMITH, None — Maxwell's synthesis of the varied results of the accumulated knowledge of electricity and magnetism, based largely on the searching insights of Faraday, still provide new issues to explore. A case in point is a well recognized anomaly in the Maxwell equations: The laws of electricity and magnetism require two 3-vector and two scalar equations, but only six dependent variables are available to be their solutions, the 3-vectors **E** and **B**. This leaves an apparent redundancy of two degrees of freedom (J. Rosen, AJP **48**, 1071 (1980); Jiang, Wu, Povinelli, J. Comp. Phys. **125**, 104 (1996)). The observed self-consistency of the eight equations suggests that they contain additional information. This can be sought as a previously unnoticed constraint connecting the space and time variables,**r** and t. This constraint can be identified. It distorts the otherwise Euclidean 3-space of **r** with the extremely slight, time dependent curvature $k(t) = R_{\rm curv}^{-2}(t)$ of the 3-space of a hypersphere whose radius has the time dependence $dR_{\rm curv}/dt = \pm c$ nonrelativistically, or $dR_{\rm curv}^{\rm Lor}/dt = \pm ic$ relativistically. The time dependence is exactly that of the Hubble expansion. Implications of this identification will be explored.

Felix T. Smith
None

Date submitted: 17 Nov 2014 Electronic form version 1.4