1156-35-349 **P. Robert Kotiuga***, 8 Saint Mary's Street, Boston, MA 02215. *Ramifications, old and new, of the curl Eigenvalue problem.* Preliminary report.

The operator d* acts on coclosed 1-forms on a compact 3-dimensional manifold with boundary, and when subject to suitable boundary conditions, it is self-adjoint (S-A). When the formalism of differential forms on a Riemannian manifold is restricted to 3-d Euclidian space E^3, this operator becomes the curl operator of Gibbsian vector analysis. As a S-A operator, its spectral theory has a surprisingly diverse set of applications. In E^3 the eigenforms are known as Beltrami flows; they characterize force-free magnetic fields. Such eigenforms are also computed on $SU(2)$, the conformal compactification of E^3. The spectral theory also arises on 3-d cocompact double coset spaces such as $\Gamma\backslash SL(2,\mathbb{R})$ or $\Gamma\backslash SL(2,\mathbb{C})/SU(2)$, where Γ is a discrete group arising in analytic number theory. The present work considers the curl EVP on these constant curvature spaces, the relationship to analytic torsion, and a seven dimensional analog of the force-free magnetic field problem involving the exceptional Lie group G_2. (Received January 27, 2020)