Abstract Submitted
for the OSS18 Meeting of
The American Physical Society

Electric Fields of 2-Dimensional Current Carrying Surfaces NIKHIL WATSA, BRETT BOLEN, BEN HOLDER, Grand Valley State Univ — The equations of electromagnetism describe how electric fields are produced by charge distributions in 3D space and how electric fields drive current in matter. If current is constrained to a 2D surface, the driving electric field effectively becomes a 2D field. By studying these 2D fields, we find that they have different properties than their 3D counterparts. For example, electric field strength of a point source is inversely proportional to radius in a 2D field, whereas it is inversely proportional to the radius squared in 3D fields. Moreover, the relationship between field strength and radius is depends on the spatial curvature of the surface. Therefore, with 2D analogs, we can study the influence of spatial curvature on effective field strength. In this project, we theoretically and experimentally study electric fields driving current on flat, conical, and spherical surfaces in order to evaluate the effect of curvature on field strength.

Nikhil Watsa
Grand Valley State Univ

Date submitted: 02 Mar 2018 Electronic form version 1.4