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The Geometry Underlying Electromagnetism SCOTT ALSID, MARIO SERNA, United States Air Force — Geometry is often characterized by parallel transporting a vector along a closed path, where the curvature is proportional to the angle change after transport around the loop. This is the curvature used in General Relativity. This talk will explain how curvature relates to E&M. In this talk, I will show three superficially different schools for manifesting this geometry to represent E&M. I will describe how to make rigorous the "rings" used by Brian Green to depict Kaluza-Klein theory. I will describe how to visualize curvature of E&M fields with Grassmanians using a technique developed with Prof Cahill in the 2000s. Last, I will connect these representations to work done at MIT on a hidden spatial geometry of Yang-Mills theory of which E&M is a special case. We will also discuss the relationship between the Grassmanians of elementary electric field arrangements and the spin-less wave function of an electron with regards to a deeper meaning of Gauss's Law.

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