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Unifying Geometrical Interpretations of Gauge Theory SCOTT ALSID, MARIO SERNA, US Air Force Academy — We seek to unify three camps that have developed geometric interpretations of gauge theory over the last century: those who use the compactified dimensions of Kaluza-Klein theory, those who use an embedding to represent gauge fields, and those who use a hidden spatial metric to replace the gauge fields. This paper identifies a correspondence to directly relate the geometrical interpretations of the three camps. Each camp attempts to isolate the gauge-invariant core responsible for the resulting physics. By providing a mapping between geometrical interpretations, physicists can now borrow and share results between each camp. In addition, we provide visual examples of the geometrical relationships between each camp for $U(1)$ electric and magnetic fields.

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