Modeling Magnetic Fields using Helical Solutions to Maxwell’s Equations BRIAN POLLACK, Northwestern Univ, RYAN PELLICO, Trinity College, MICHAEL SCHMITT, Northwestern Univ — The current generation of HEP experiments require precise knowledge of the magnetic fields that permeate detector hardware. After a solenoid is constructed, the field produced will always differ from simulations due to unavoidable real-world limitations and tolerances. We explore a novel method in which one can accurately and precisely model a solenoidal field from a sparse series of field measurements, using a series solution to Maxwell’s Equations. In order to model the small but non-negligible axial asymmetry due to the winding of a solenoid, we use a helical coordinate system in which to solve said equations. Using this method, one can obtain a full three dimensional vector field that is reliable to over 4 orders of magnitude, and guarantees a physically sound result that cannot be obtained through interpolation methods.