A New DA and TM Based Approach to Design Air-Core Magnets

Shashikant Manikonda
Argonne National Laboratory, USA

Air-core magnets are commonly used components of high energy physics and nuclear physics accelerators for guiding charged particle beams. The design of air-core magnet is dominated by the precise placement of current carrying coils. The resulting magnetic field can be obtained by direct application of the Biot-Savart law. A new DA and TM based approach was implemented to describe the current carrying coils and to compute the resulting magnetic field. This new approach provides a unique way to analyze the field uniformity, extract multipole components of the field and to design air-core magnets. We will present this approach and discuss the application of this approach to the design and analysis of multipole magnets for the Super Separator Spectrometer (S^3) being built at GANIL, France.