# AMPERES

3D Magnetic Design Software

AMPERES is **INTEGRATED's** powerful three-dimensional magnetic field solver offering superior design capabilities in one fully integrated package.

AMPERES greatly expands design potential and allows you to simulate and optimize electromagnetic components and systems before the manufacturing stage. Avoid building multiple prototypes. Lower your development costs and times. Reach the market faster than ever before. Select the best analysis method for your application; **AMPERES** provides both **Finite Element Method (FEM)** and **Boundary Element Method (BEM)** solvers, and includes **full parallel processing** as well as Application programming Interface (API) capability.

Engineers and scientists depend on **AMPERES** for the design and analysis of magnetic equipment and components including:

- electromagnet and permanent magnet assemblies
- AC/DC motors and generators
- solenoids, relays and actuators
- sensors
- magnetic shielding
- particle accelerator magnets
- magnetic levitation and bearing systems
- magnetizing fixtures
- recording heads
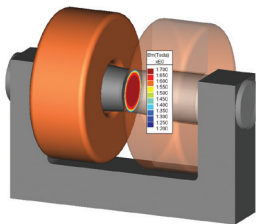
Electromagnet used in a wide range of teaching, research and industrial applications where a medium sized volume of field is required – Courtesy of GMW
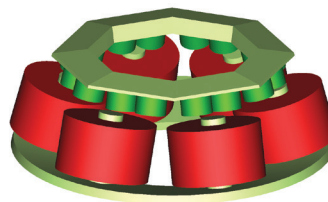
Computational analysis of electromagnetic drive system in a Left Ventricular Assist Device (LVAD) – Courtesy of University of Nottingham

Hybrid Simulation Tools for Electromagnetic and Particle Trajectory Design Analysis

SOFTWARE THAT LIVES UP TO THE POWER OF YOUR IDEAS

WE GO BEYOND TRADITIONAL MULTIPHYSICS:

- Search-based 3D Magnetic Design Software **NEW**
- Metaheuristic approach for optimizing simulation based electromagnetic designs. **NEW**
- INTEGRATED's latest innovation "**Coils and Windings Editor**" to facilitate AC motor design. **NEW**
- Precise calculation of electromagnetic parameters using our proprietary **Boundary Element Method (BEM) solvers.**
- **Finite Element Method (FEM) in addition to BEM.** This hybrid approach uses the strength of each method while designing an electromagnetic system.
- Built-in API, Parametric and/or Scripting capabilities

The **INTEGRATED API** enables the direct control of program functions by utility scripts or macros created in tools such as EXCEL or Visual Studio. Scripting can control the entire process of model creation and testing.

- Direct import of models from CAD Partners including: Autodesk, PTC, Solid Edge and SolidWorks.

MORE BENEFITS:

- Coupling to Celsius for **thermal analysis.**
- Easy-to-use and intuitive interface.
- High resolution 3D graphic representations that can show enhanced tracing of points on a model.
- Automatic meshing and removal of intersecting geometries.
- World class support team ready to unlock your ideas.

"**E**ach **INTEGRATED** package is designed for solving specific problems. **AMPERES** is a 3D magnetic field solver package and that is all that it does. I was looking for a package that would let me model magnets in 3D space and analyze the forces on that model. The way **AMPERES** does that is very simple and it is easy to get your head around. I was up and running in a couple of days."

— Andrew Hilton, School of Mechanical, Materials and Manufacturing Engineering, The University of Nottingham

3D graph that can show enhanced tracing of points on model

PUT OUR SOFTWARE TO THE TEST

Don't take our word for it.

Contact us for a free 30 day evaluation and start improving productivity today. Ask for a live demo.

Visualize, Analyze, Optimize

AMPERES is the complete design and analysis software for 3D magnetic systems. Built-in **API, Scripting Capability** and **Parametric Utilities** enable automated model creation. **Self-Adaptive BEM** and **FEM** solver results in rapid optimization of complex designs.
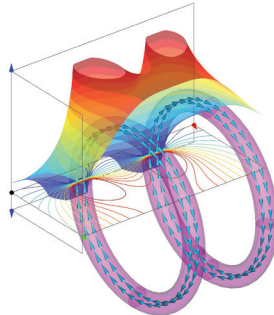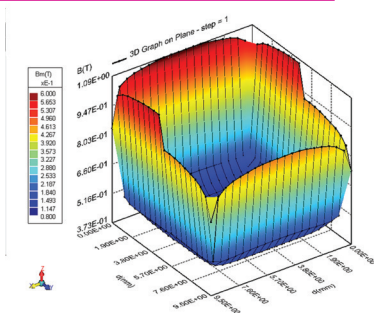

3D Model of Helmholtz Coils showing Profile and Contour Plots of axial component of B Field
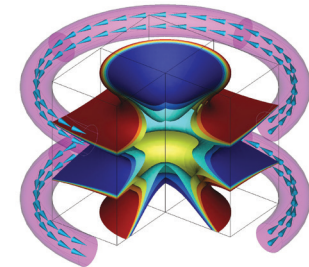
3D Model of Helmholtz Coils showing Isosurfaces Plots of axial component of B Field

AMPERES comes complete and ready to use. Purchase of additional modules or options is not needed. **AMPERES** is a fully functional CAE tool. A partial list of **AMPERES'** standard features includes:

- Latest innovation "Coils and Windings" editor to analyze large number of coils/rotational transients or highly non-linear switching sources and loads

- Intuitive and structured interface which maximizes productivity for experts and beginners

- Static and phasor analysis modes

- Simulation of non-linear ferromagnetic and permanent magnet materials

- Simulation of lossy magnetic materials

- Force, torque, flux linkage and inductance calculation

- Periodic and symmetry features to minimize modeling and solution time

- A variety of display forms for plotting scalar and vector field quantities including graphs, contour plots, arrow plots, profile plots and vector loci plots

- High quality 3D graphics and text utility for preparation of reports and presentations

- Data exportable to formatted files for integration with spreadsheets and other software packages

- Batch Processing that allows unattended solution of multiple files

- Powerful parametric feature which allows definition of variable parameters to be stepped through for the analysis of multiple "what-if" scenarios, facilitating design optimization

- A wide array of post-processing options for design evaluation and optimization

- Self-adaptive meshing or optional user refinement

- CAD healing utilities for automatic correction of drafting errors

- Large library of permanent magnet and ferromagnetic materials to which additional materials can be easily added

INTEGRATED
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