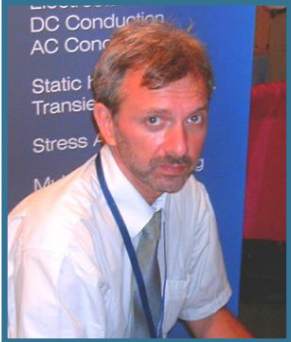




# QuickField 6.3 SP1 analysis capabilities



**Vladimir Podnos,  
Director of Marketing and Support,  
Tera Analysis Ltd.**

**QuickField features overview**



**Alexander Lyubimtsev  
Support Engineer  
Tera Analysis Ltd.**

**Live presentation: QuickField simulation examples**



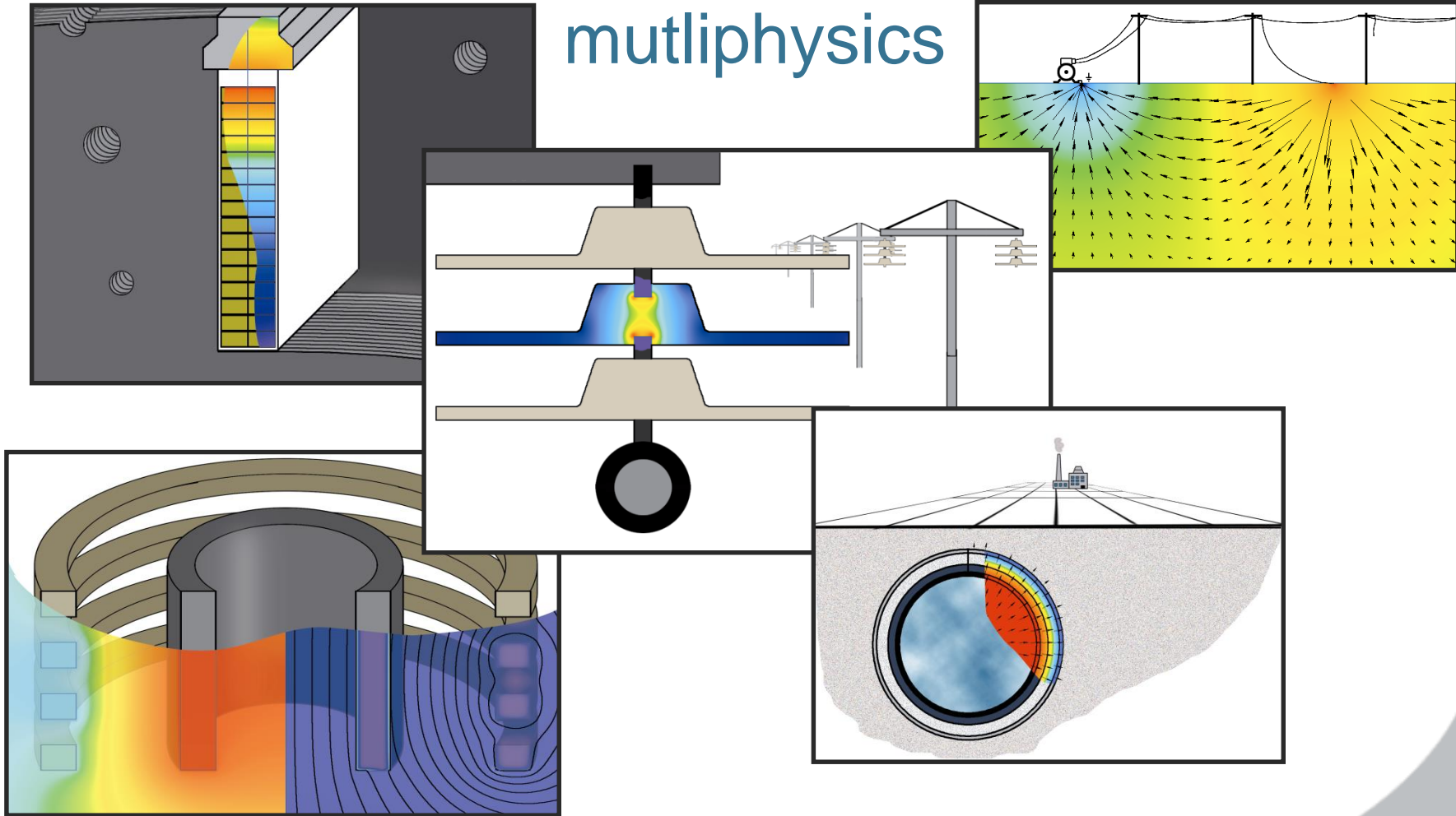
# QuickField features overview



**Vladimir Podnos,  
Director of Marketing and Support,  
Tera Analysis Ltd.**



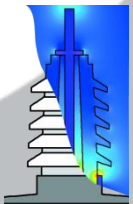
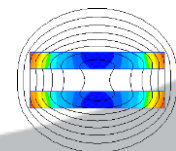
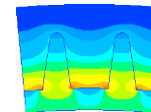
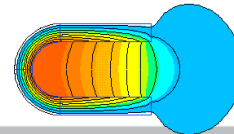
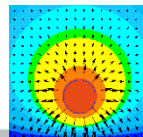
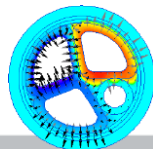
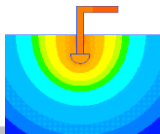
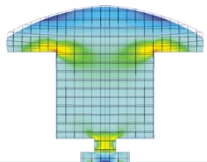
# QuickField is FEA for EM, heat transfer, stress and mutliphysics





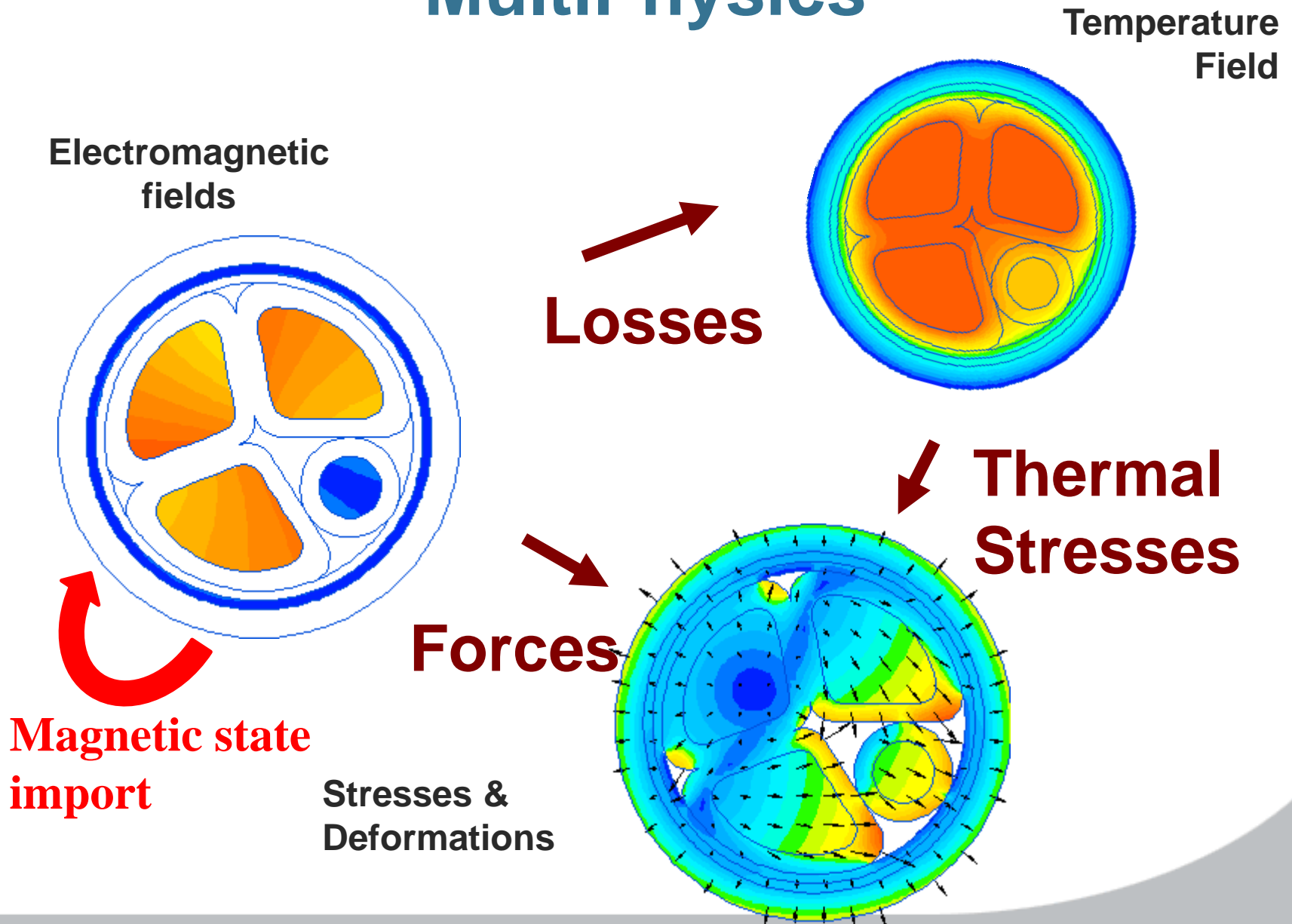
# QuickField Analysis Options

Magnetic analysis suite	
Magnetic Problems	Magnetostatics
	AC Magnetics
	Transient Magnetic
Electric analysis suite	
Electric Problems	Electrostatics (2D,3D) and DC Conduction (2D,3D)
	AC Conduction
	Transient Electric field
Thermostructural analysis suite	
Thermal and mechanical problems	Steady-State Heat transfer (2D,3D)
	Transient Heat transfer
	Stress analysis





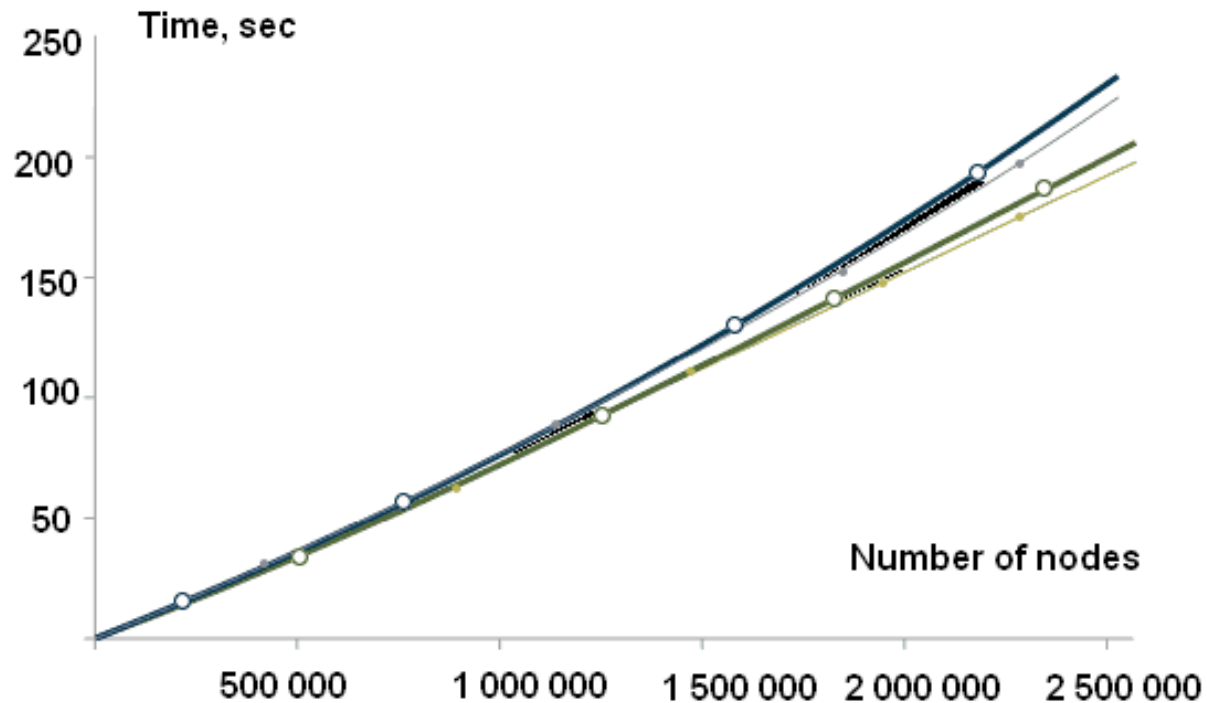
# MultiPhysics





# QuickField solvers

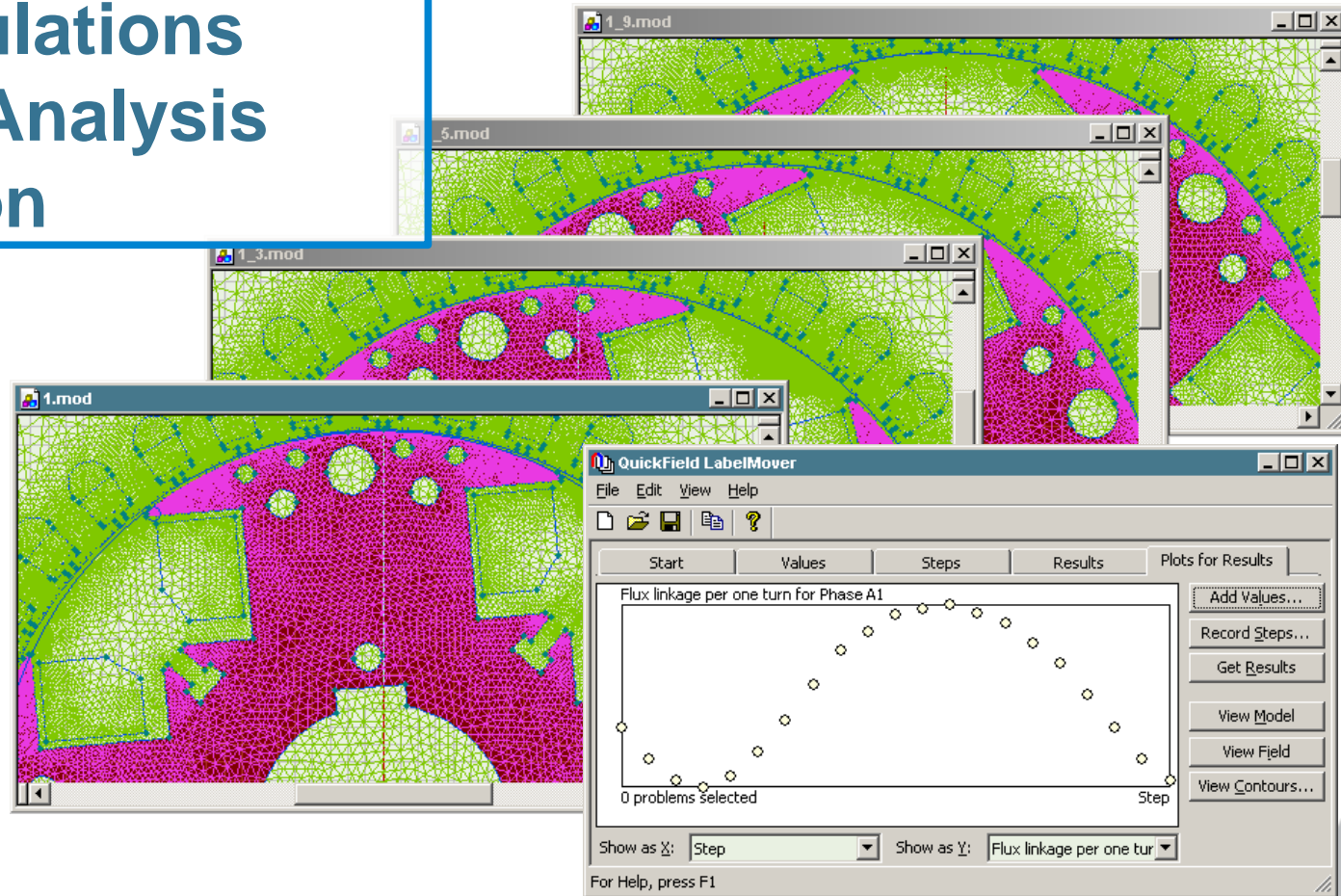
Solution time for various sizes of finite element mesh



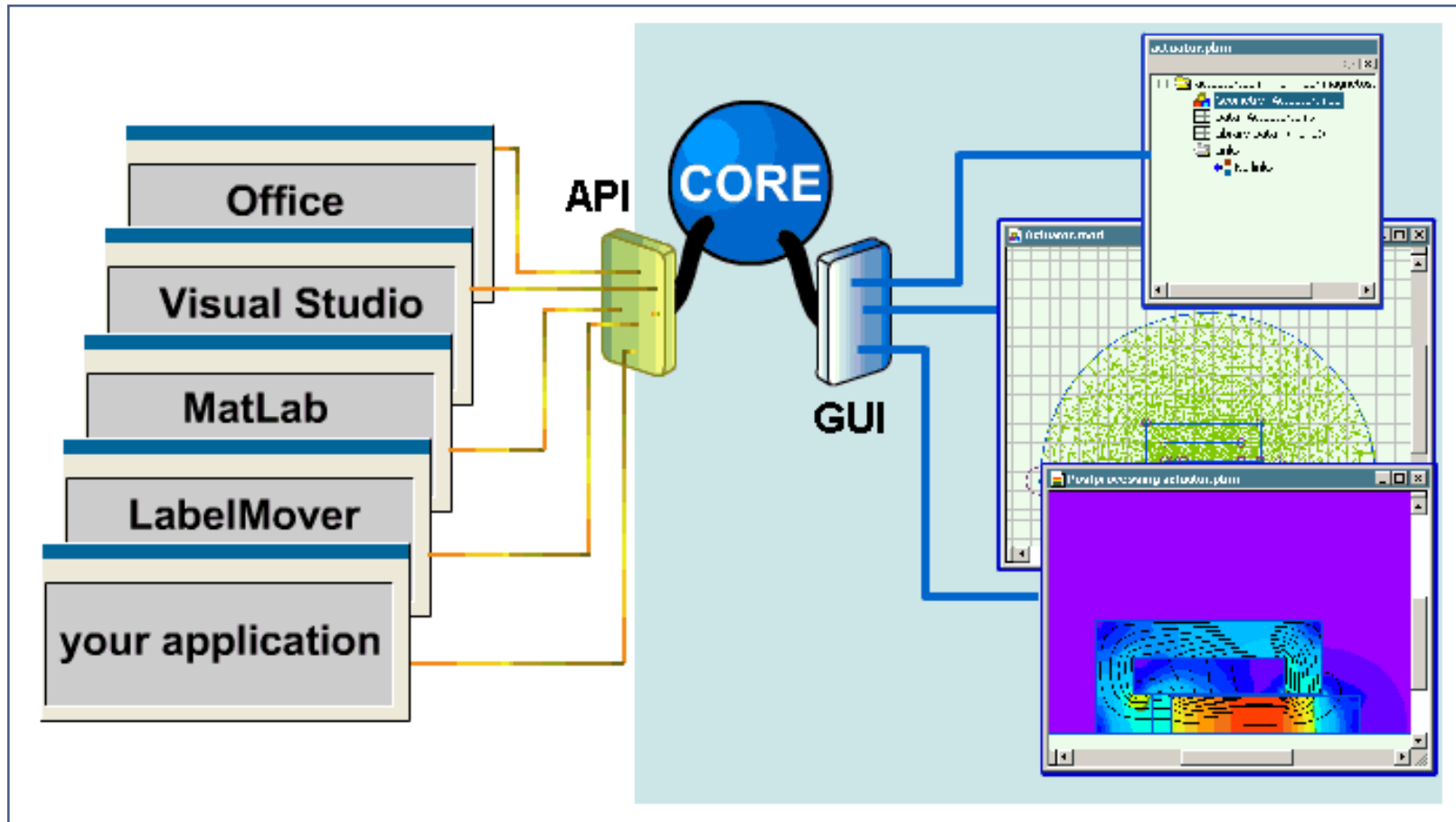


# More....

Serial calculations  
Tolerance Analysis  
Optimization



# Open object interface

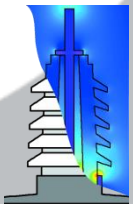
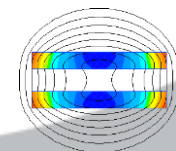
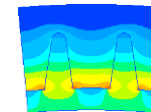
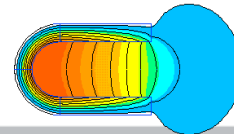
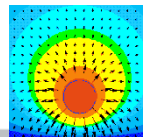
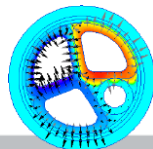
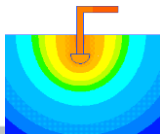
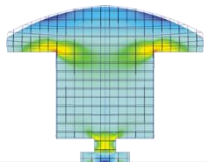




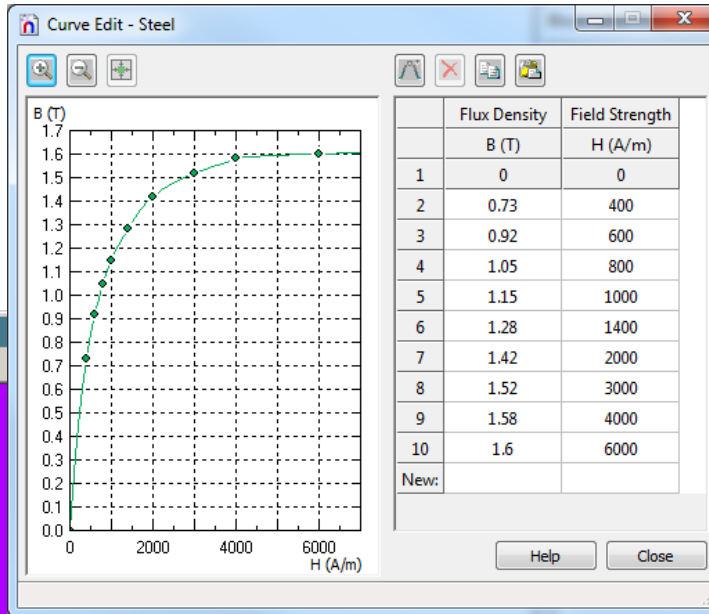
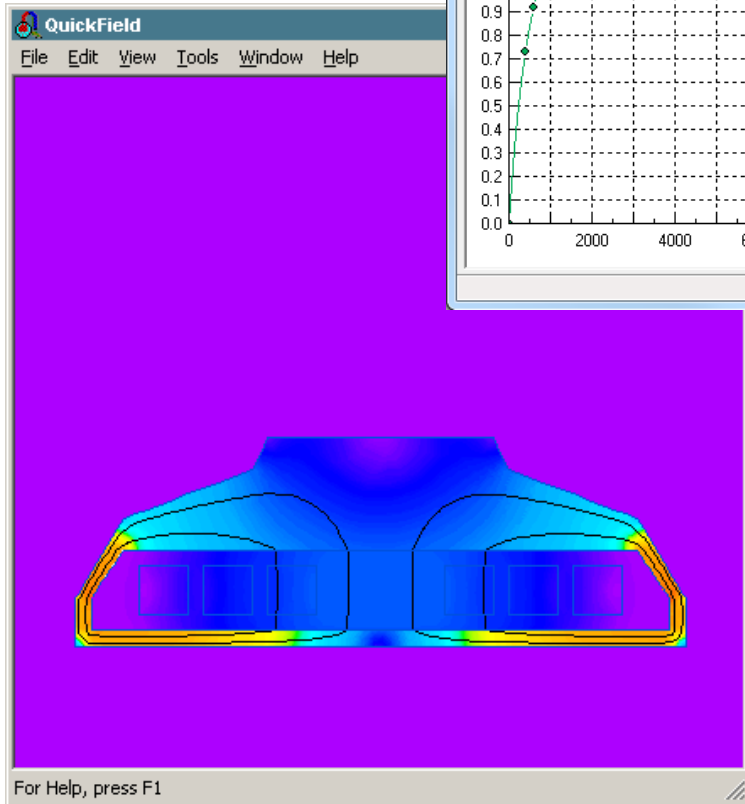


# QuickField Analysis Options

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	AC Conduction
	Transient Electric field
Thermostructural analysis suite	
Thermal and mechanical problems	Steady-State Heat transfer (2D,3D)
	Transient Heat transfer
	Stress analysis



# DC Magnetics





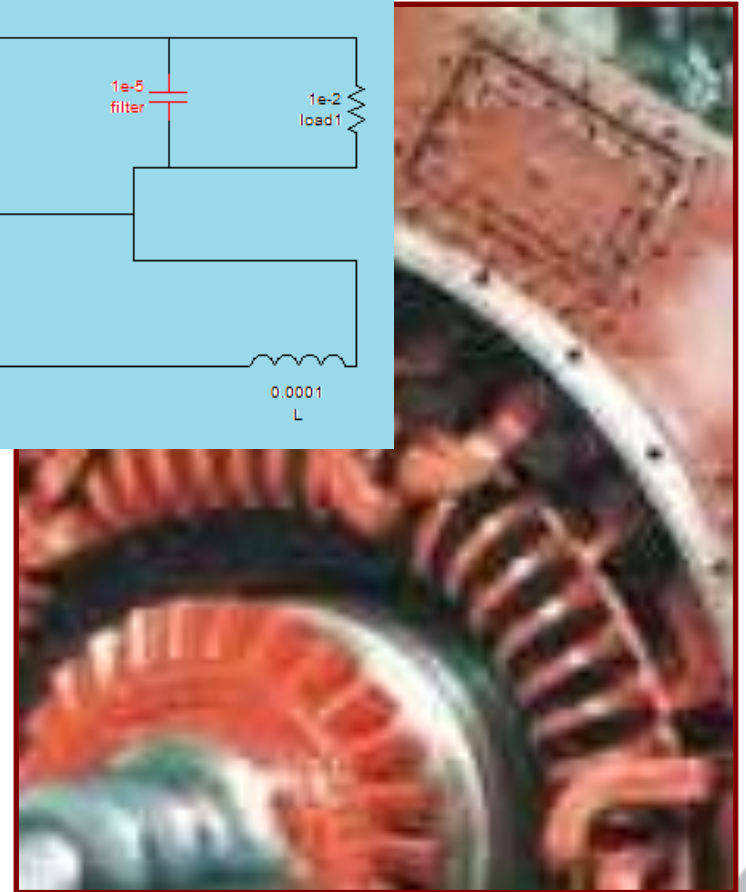
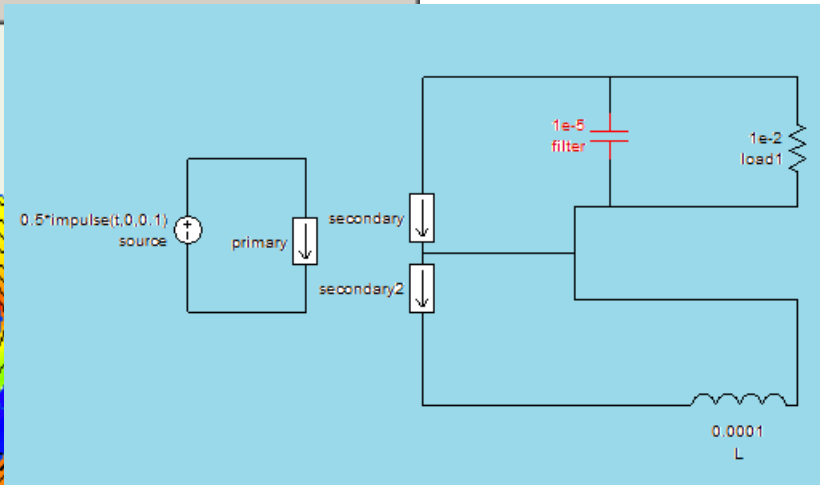
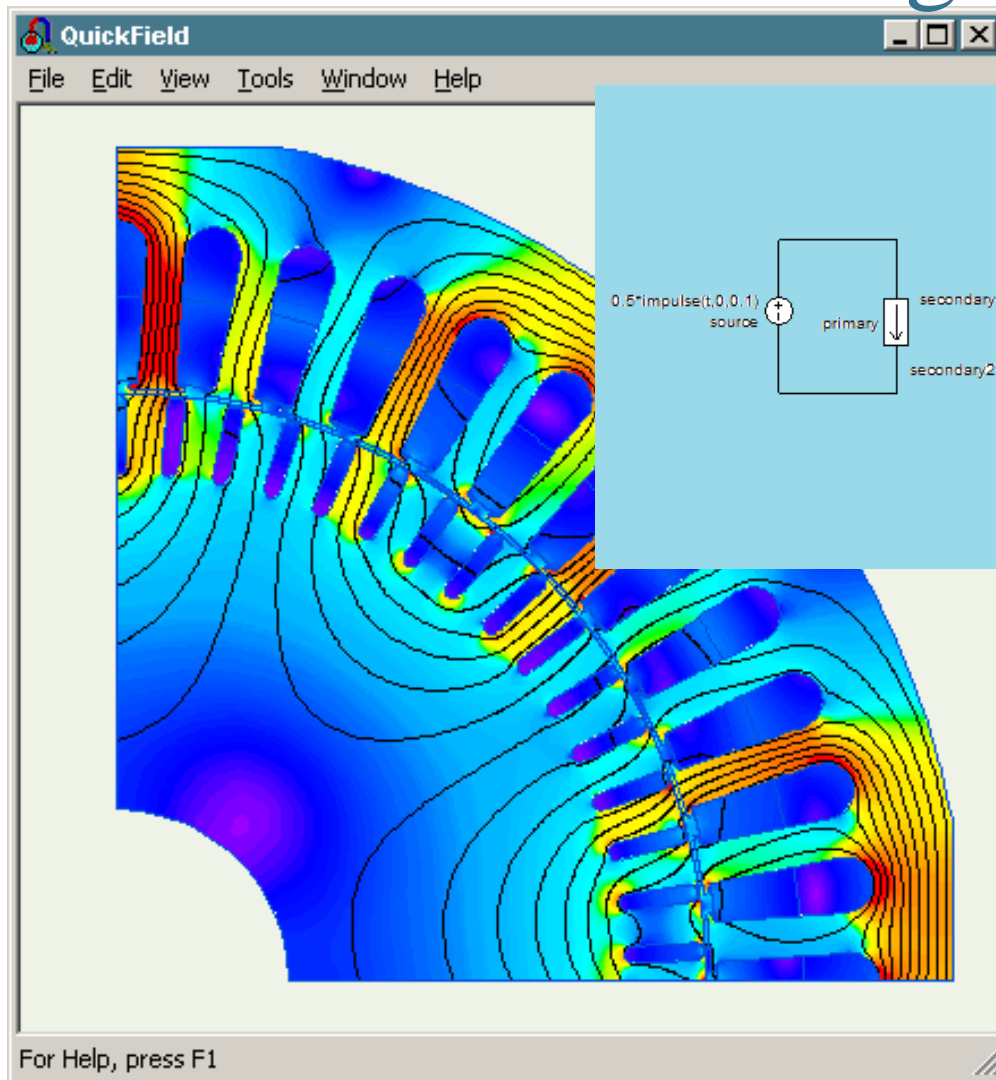
# AC Magnetics

The image is a composite of four elements related to AC magnetics simulation:

- Simulation:** A 2D magnetic field simulation showing field lines and a color-coded intensity map (blue to red) around a central core with windings.
- Software Dialog:** A "Problem Properties - HMagn2" window with the following settings:
  - Problem Type: AC Magnetics
  - Length Units: Millimeters
  - Model Class: Plane-parallel
  - Frequency:  $f = 100$  Hz (circled in red)
  - Coordinate System: Cartesian
  - Precision: Normal
  - Files: Geometry: hmagn2.mod; Data: Hmagn2.dhe
  - Location: C:\Users\Public\Documents\QuickField 6.3 Examples
- Photograph:** A photograph of a physical transformer with a copper core and a metal rod inserted through the center.
- Circuit Diagram:** A schematic showing two secondary windings labeled "secondary" and "secondary2" connected to a circuit containing a "1e-5 filter" capacitor and a "1e-2 load1" resistor in parallel, with an inductor labeled "0.0001 L" in series.

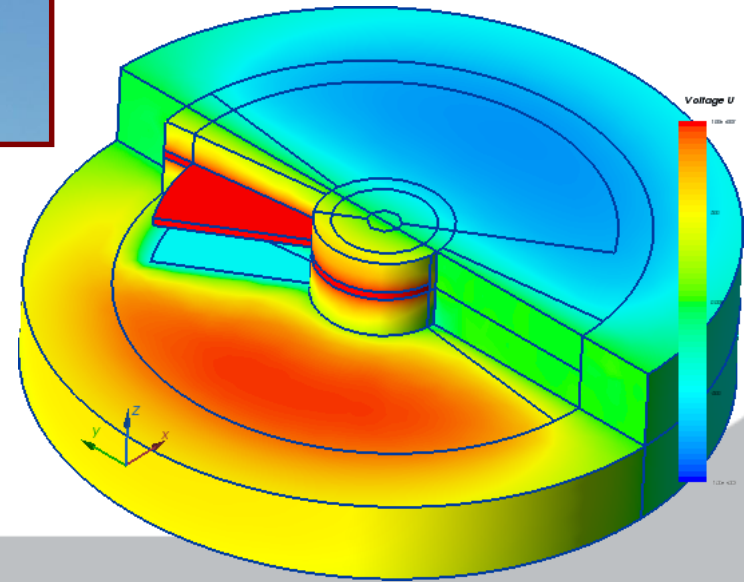
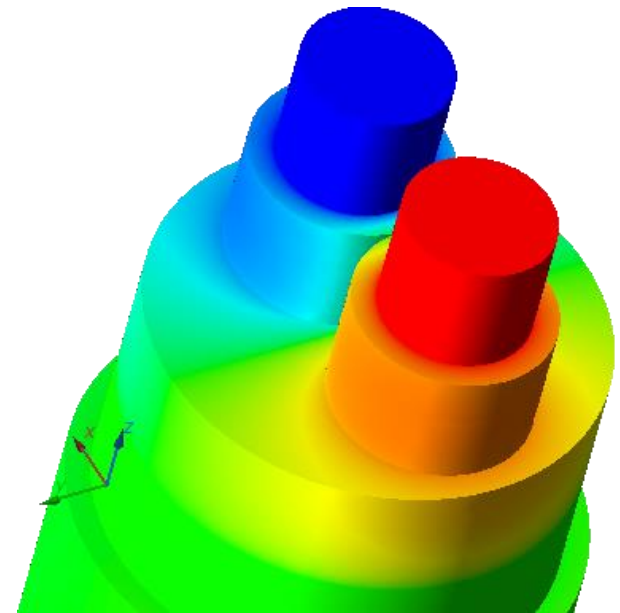
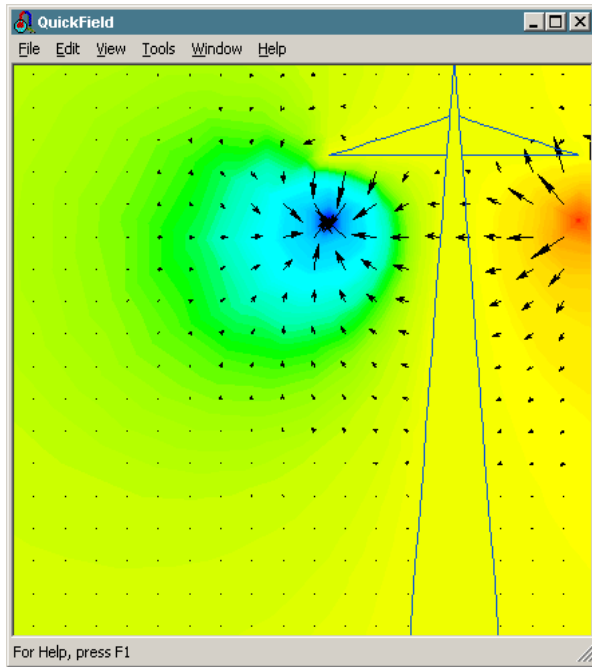


# Transient magnetics



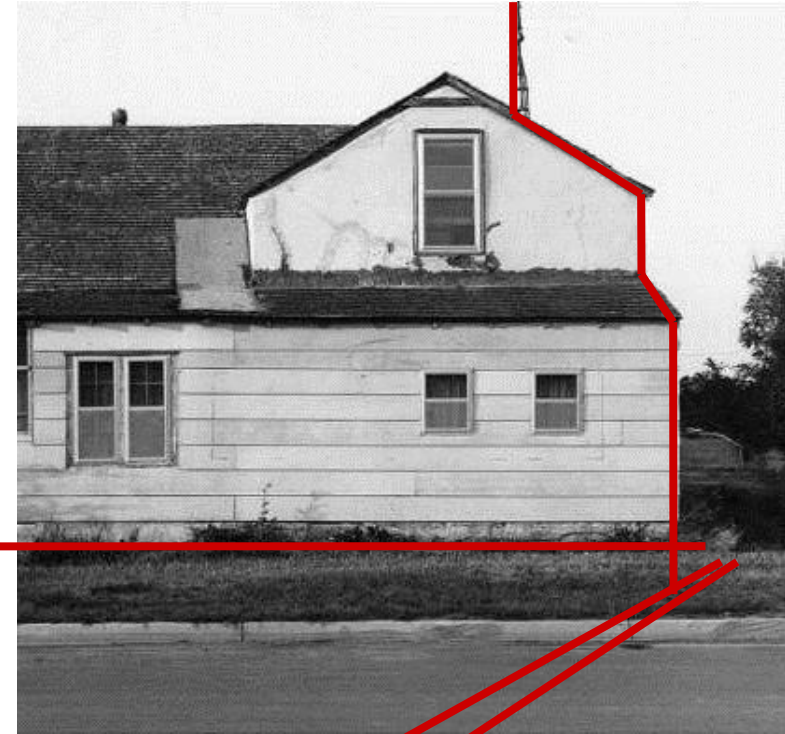
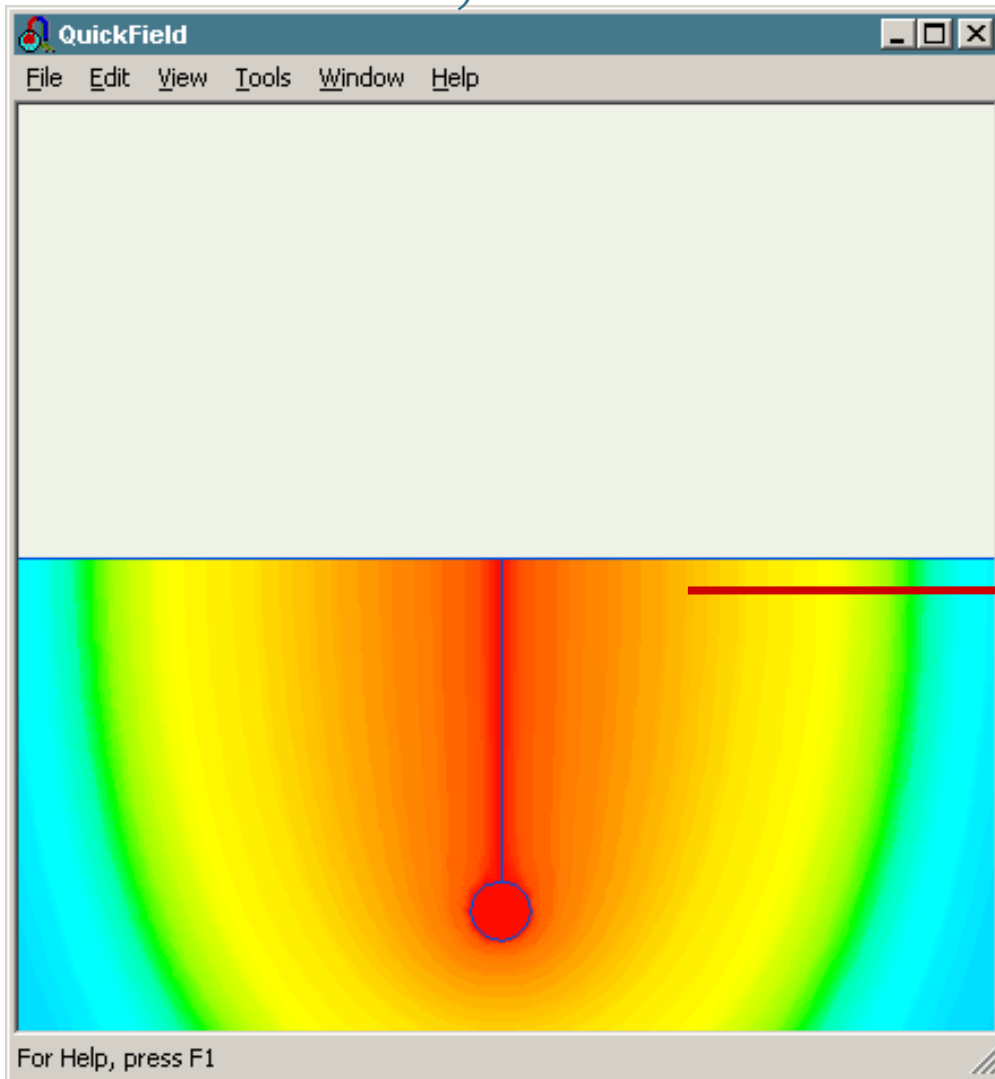


# Electrostatics



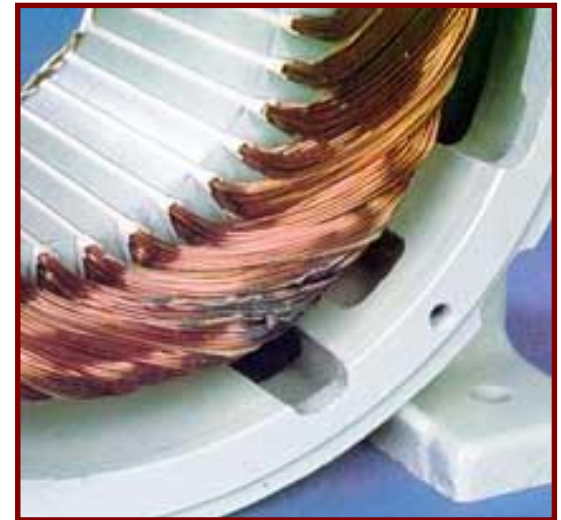
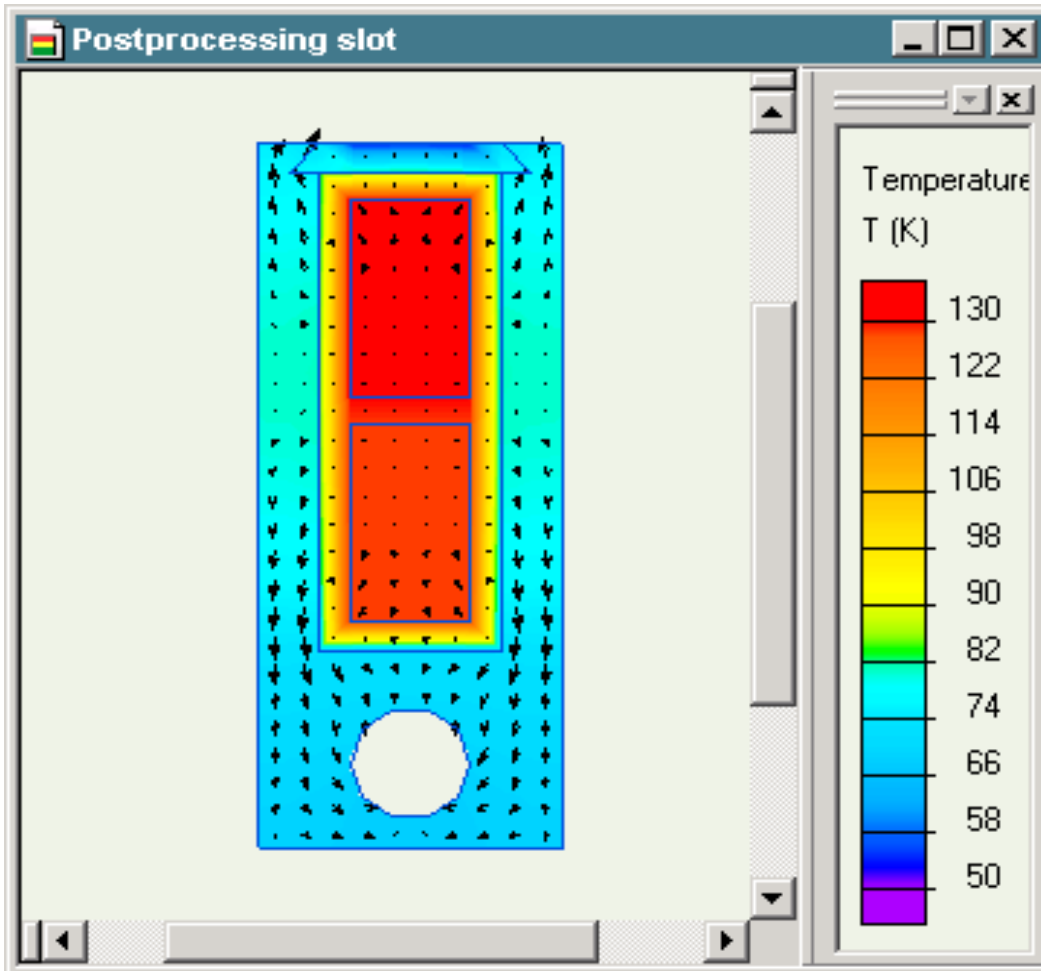


# AC, DC and Transient electric



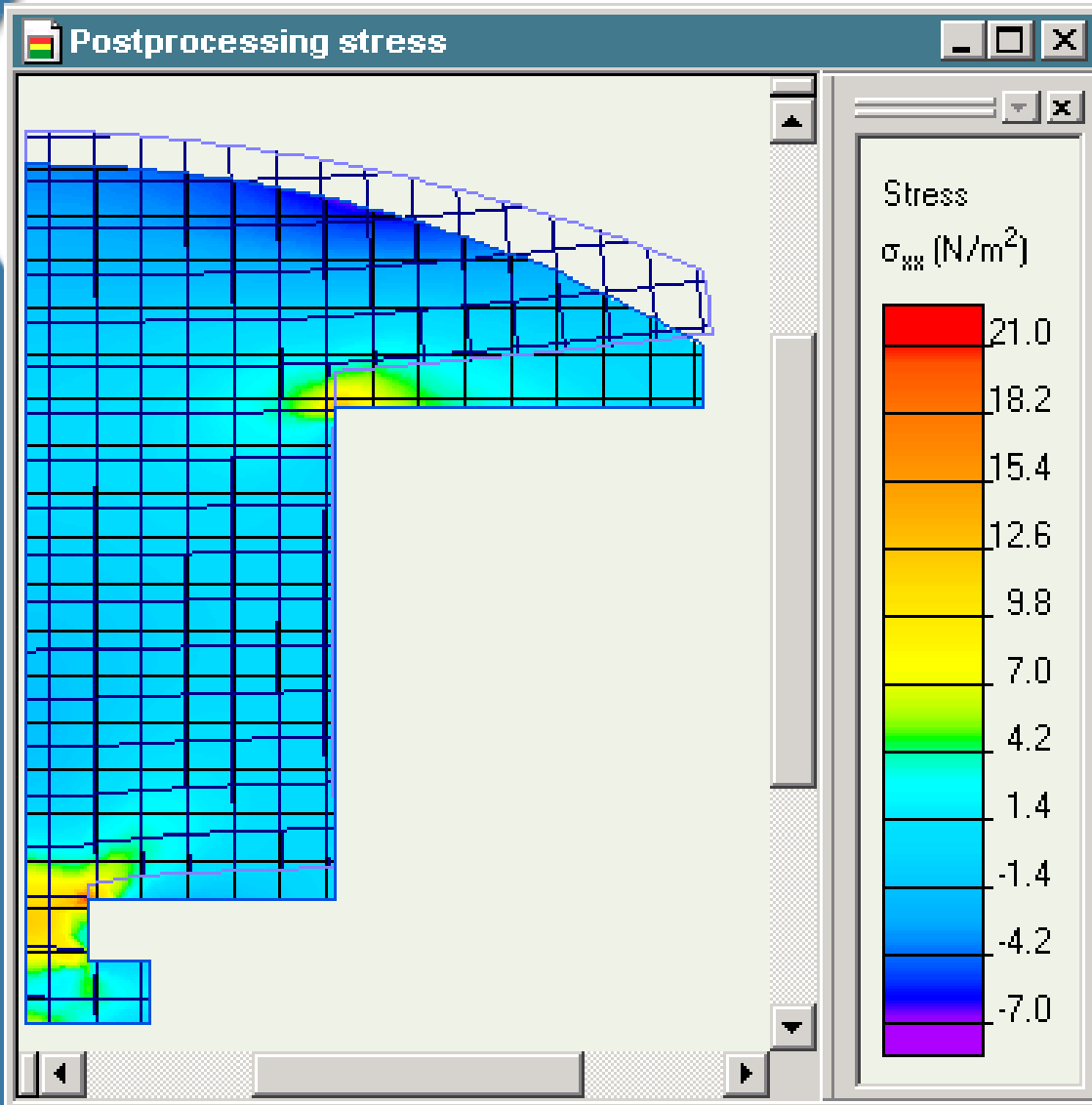


# Heat transfer





# Stress analysis



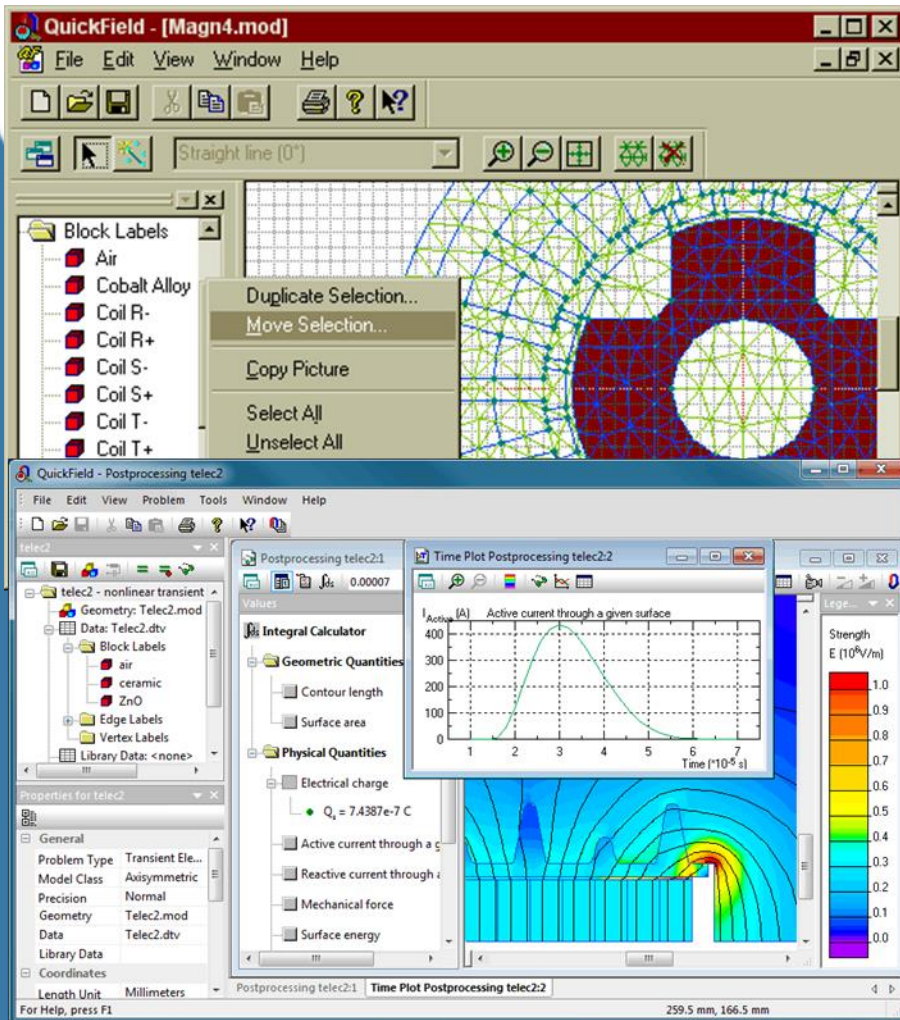




So many field simulation tools on a market.  
QuickField is not just another one...



# Common with major modern field simulation packages:



- FEM based
- Graphical User Interface
- Fully automated
- Works in Windows environment
- Compatible with CADs
- Large customer base
- Distributed and supported worldwide



# Different from most modern field simulation packages:



- Does not require training or mathematical background
- Extremely fast
- Open Object architecture and COM-compatible API
- Flexible licensing options (freeware and commercial editions)



# QuickField Difference





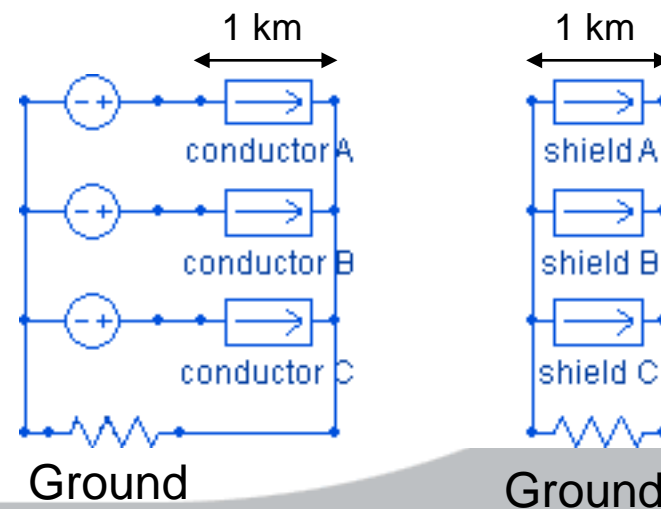
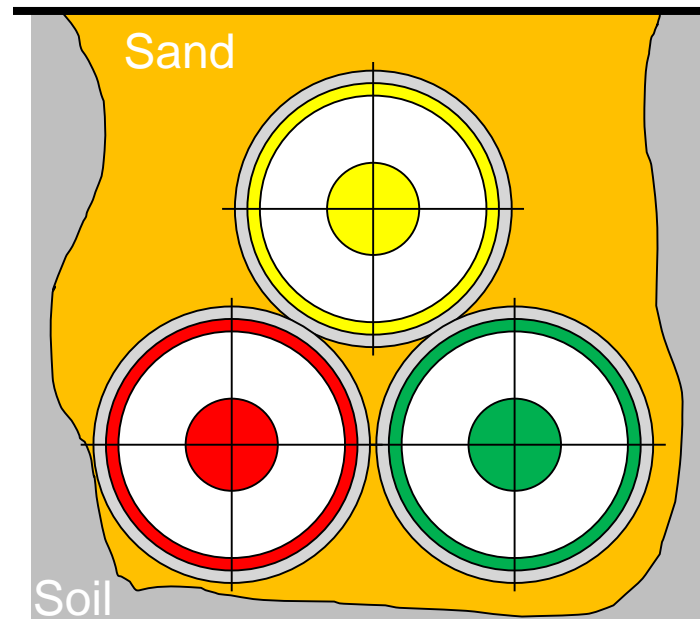
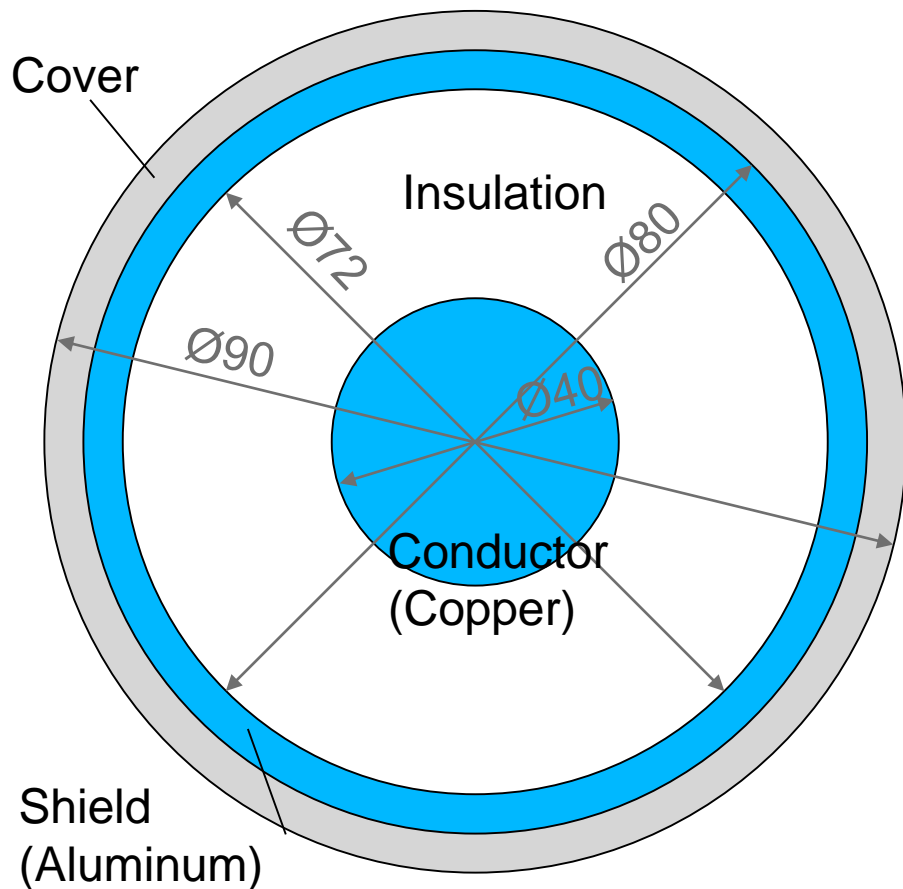
# Live presentation: QuickField simulation examples



**Alexander Lyubimtsev**  
**Support Engineer**  
**Tera Analysis Ltd.**



# High voltage cable ampacity

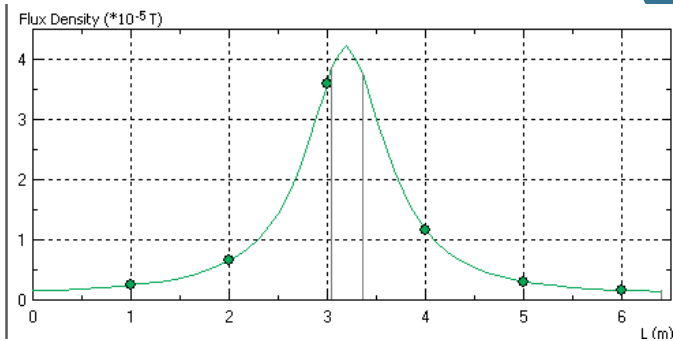


Energy Conference (ENERGYCON),  
2016 IEEE International

Comparison of finite element analysis to IEC-60287  
for predicting underground cable ampacity

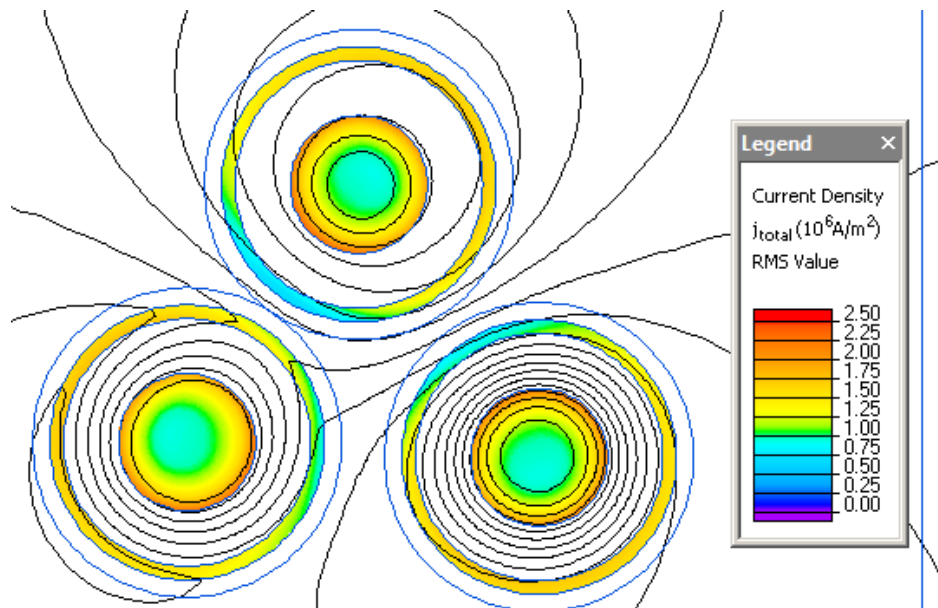


# High voltage cable ampacity AC Magnetic simulation

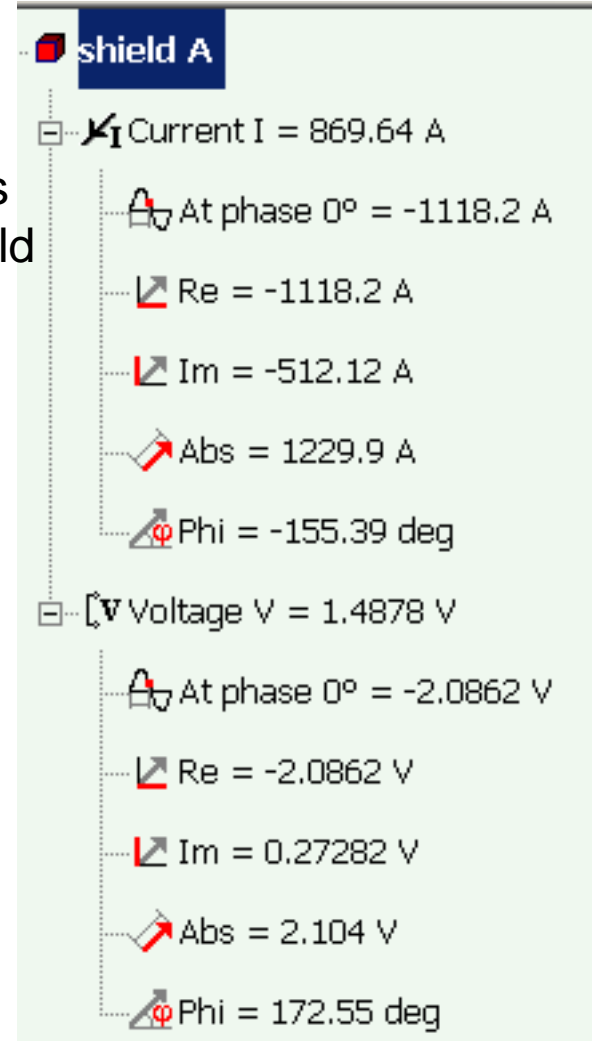


Induced currents  
in the cable shield

Flux density at ground surface

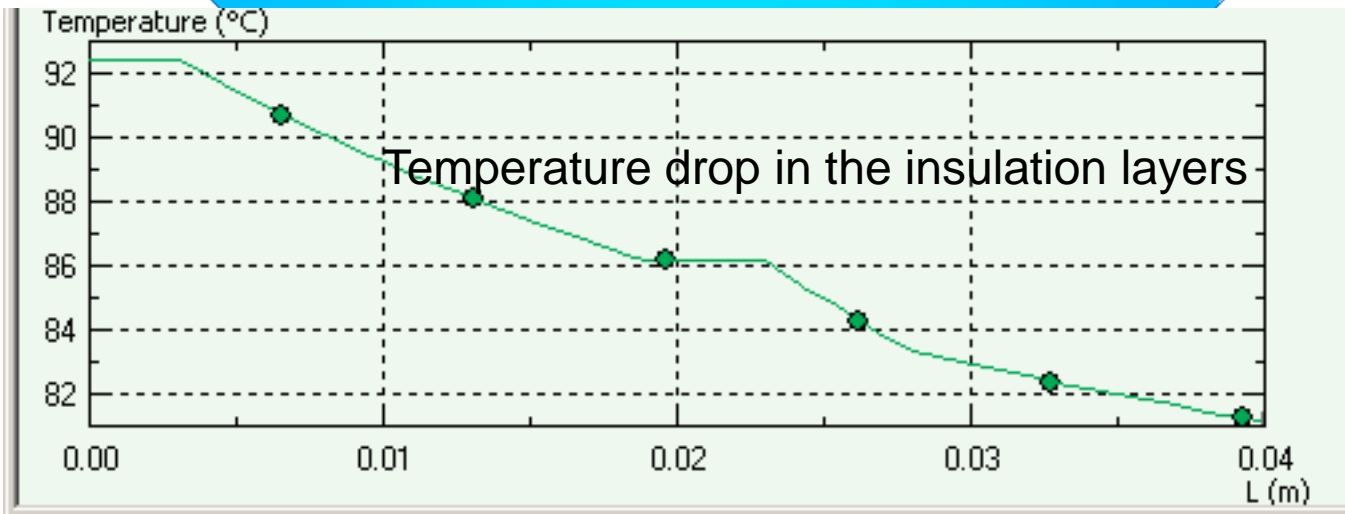
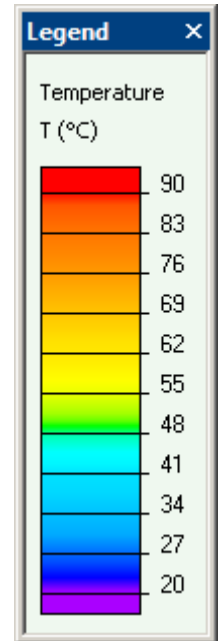
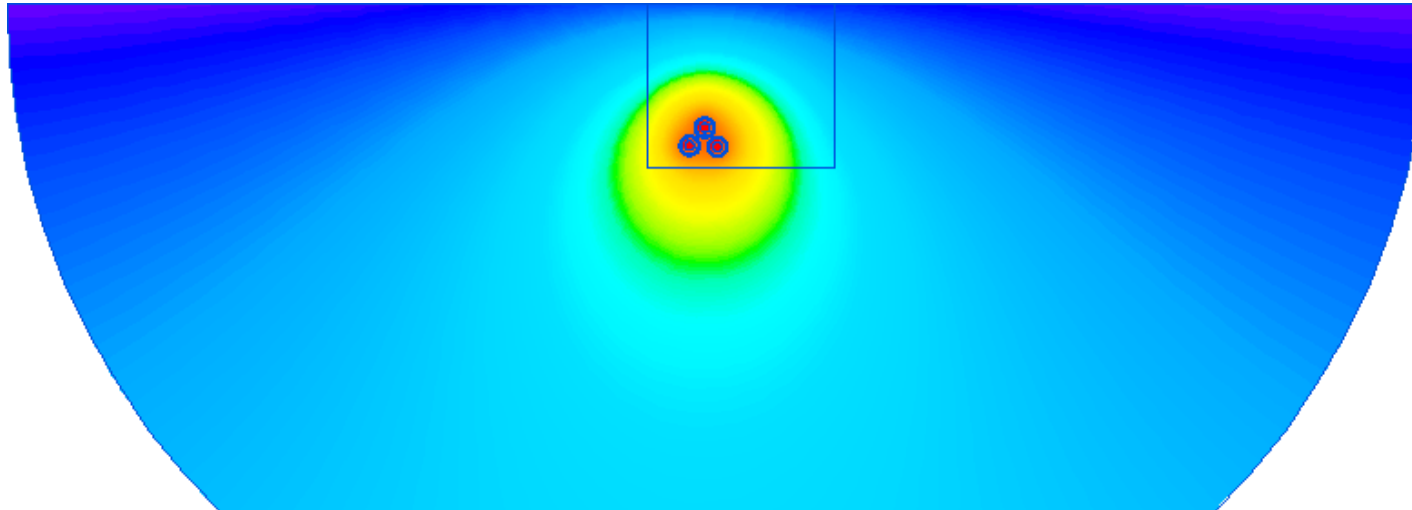


Current density distribution is not uniform





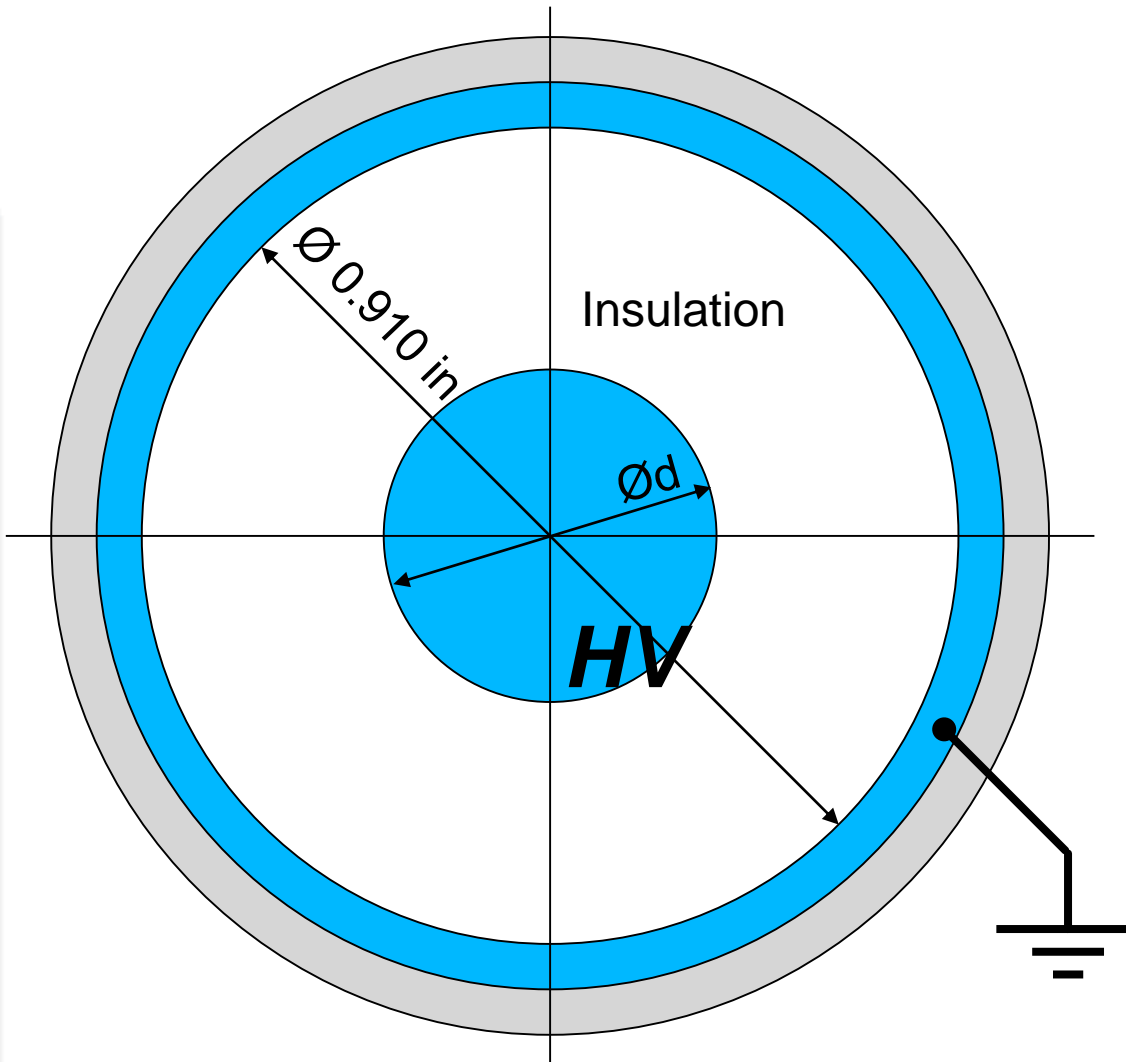
# High voltage cable ampacity Heat transfer simulation







# RG220 cable insulation electric stress



## Problem specification:

Voltage  $HV = 35 \text{ kV}$

Relative permittivity of PE insulation  $\epsilon = 2.3$

## Task:

Find optimal  $d$  to minimize electric field stress  $E[\text{V/m}]$



# RG220 cable insulation electric stress

