Magnetic Fields of an Electric Guitar Pickup

A Finite Element Analysis (FEA) using flexPDE

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Purpose of the Numerical Experiment:

The purpose of this numerical experiment is to learn something about the magnetic fields in and around a guitar string magnetic pickup coil.

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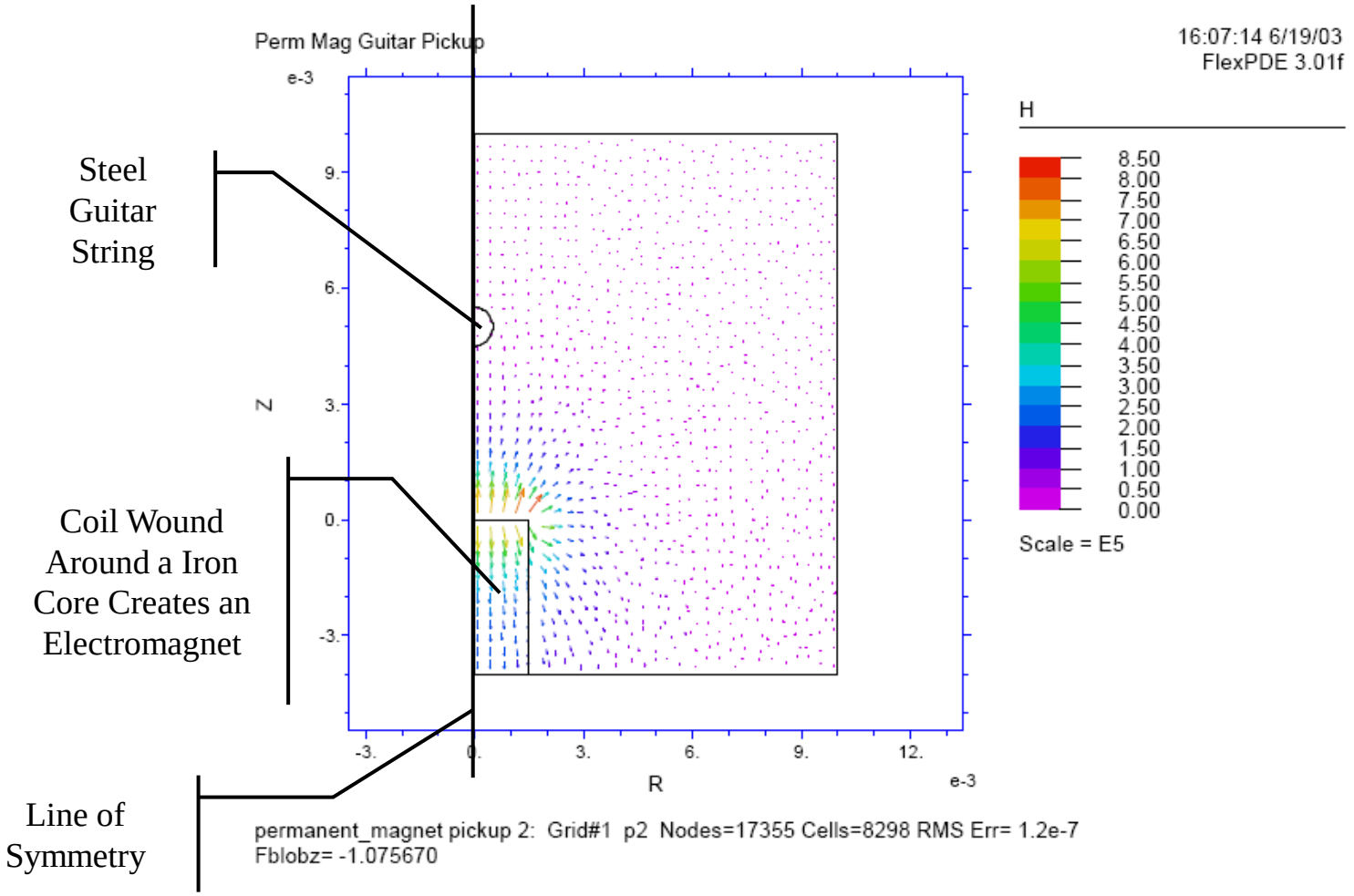

Vector Plot of the Magnetic Field Intensity – the H field

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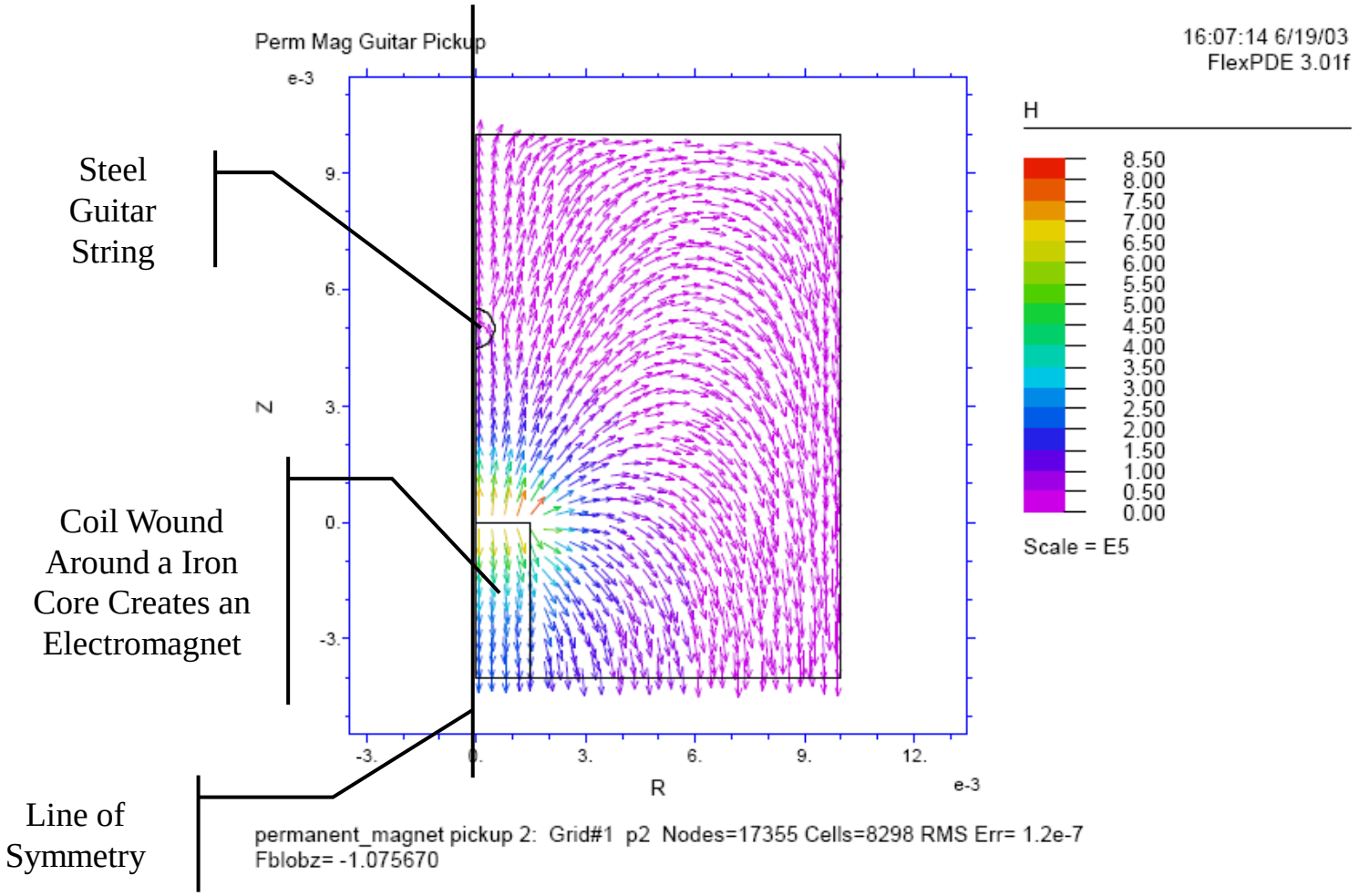

Normalized Vector Plot of the Magnetic Field Intensity – the H field

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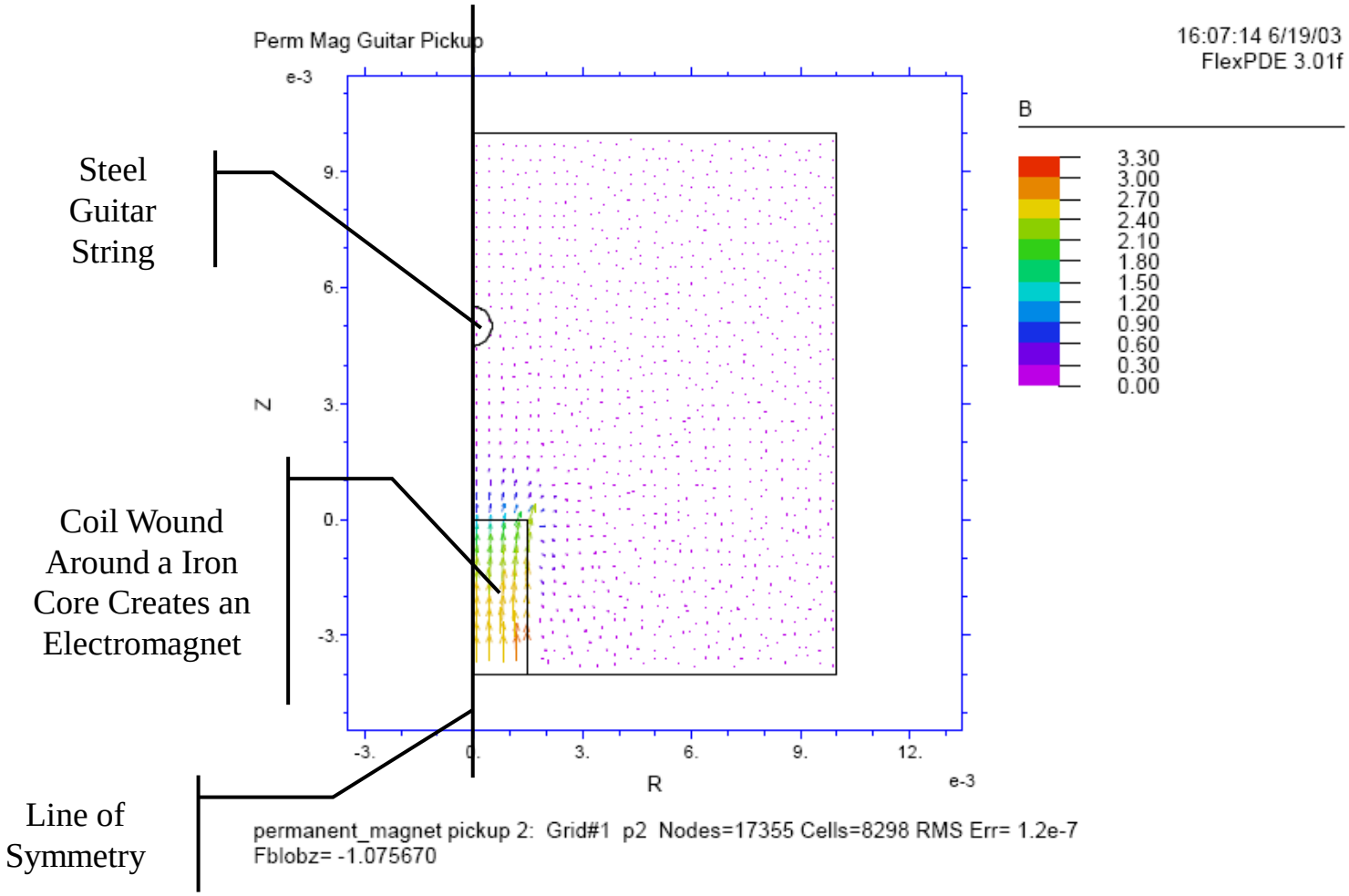

Vector Plot of the Magnetic Flux Density – the B field

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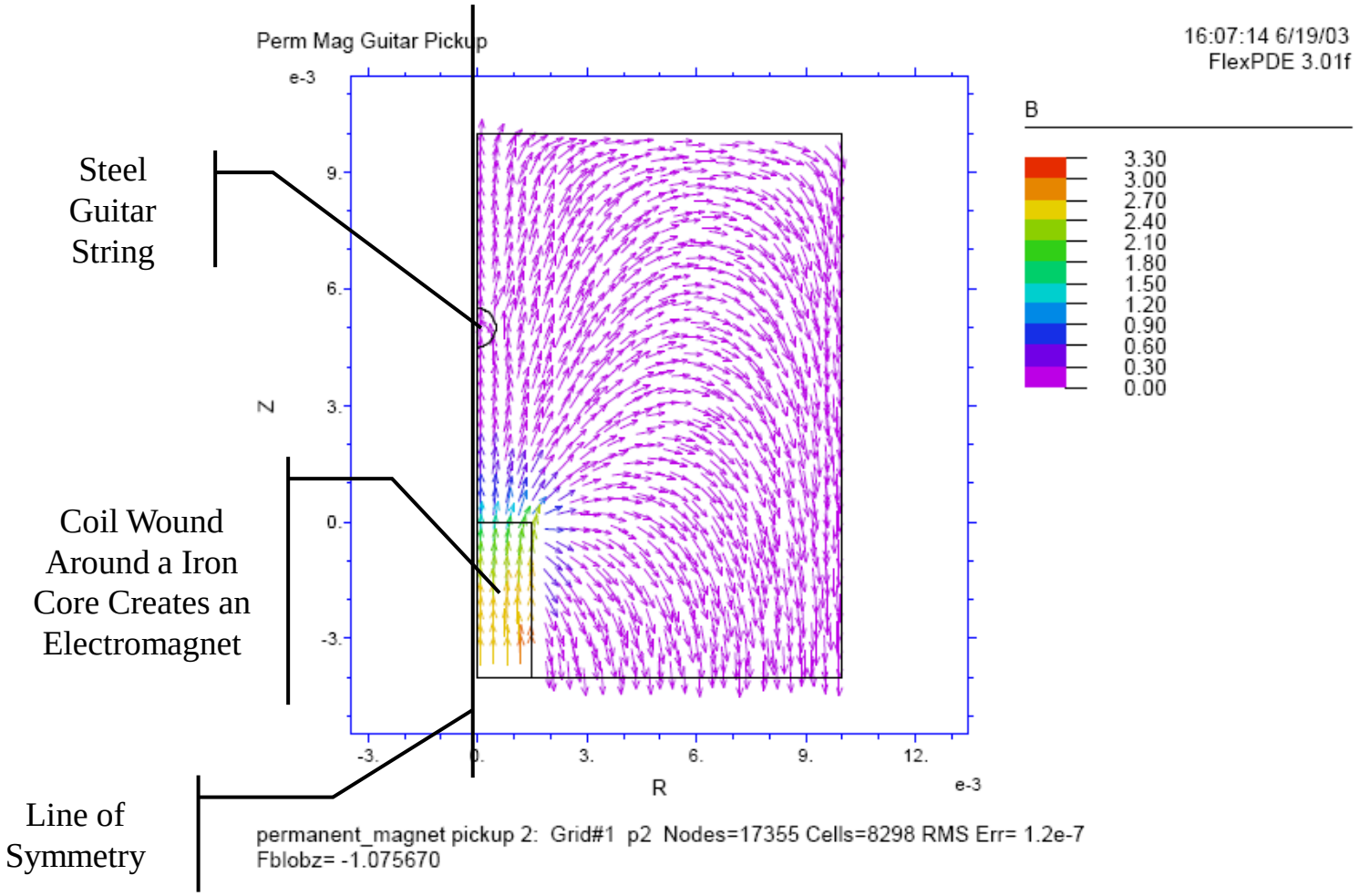

Normalized Vector Plot of the Magnetic Flux Density – the B field

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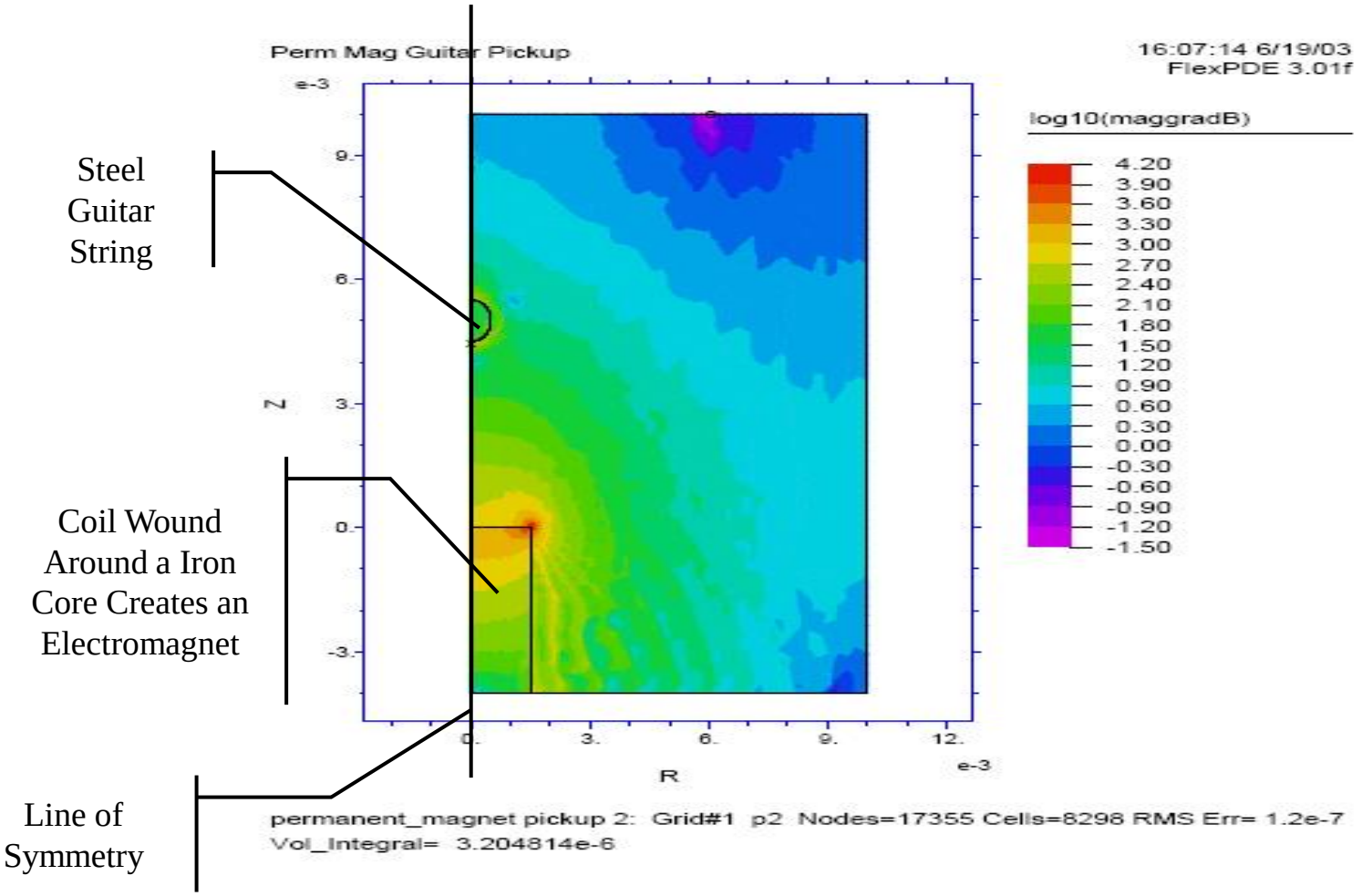

Log Plot of the Magnitude of the Magnetic Flux Density – the B field

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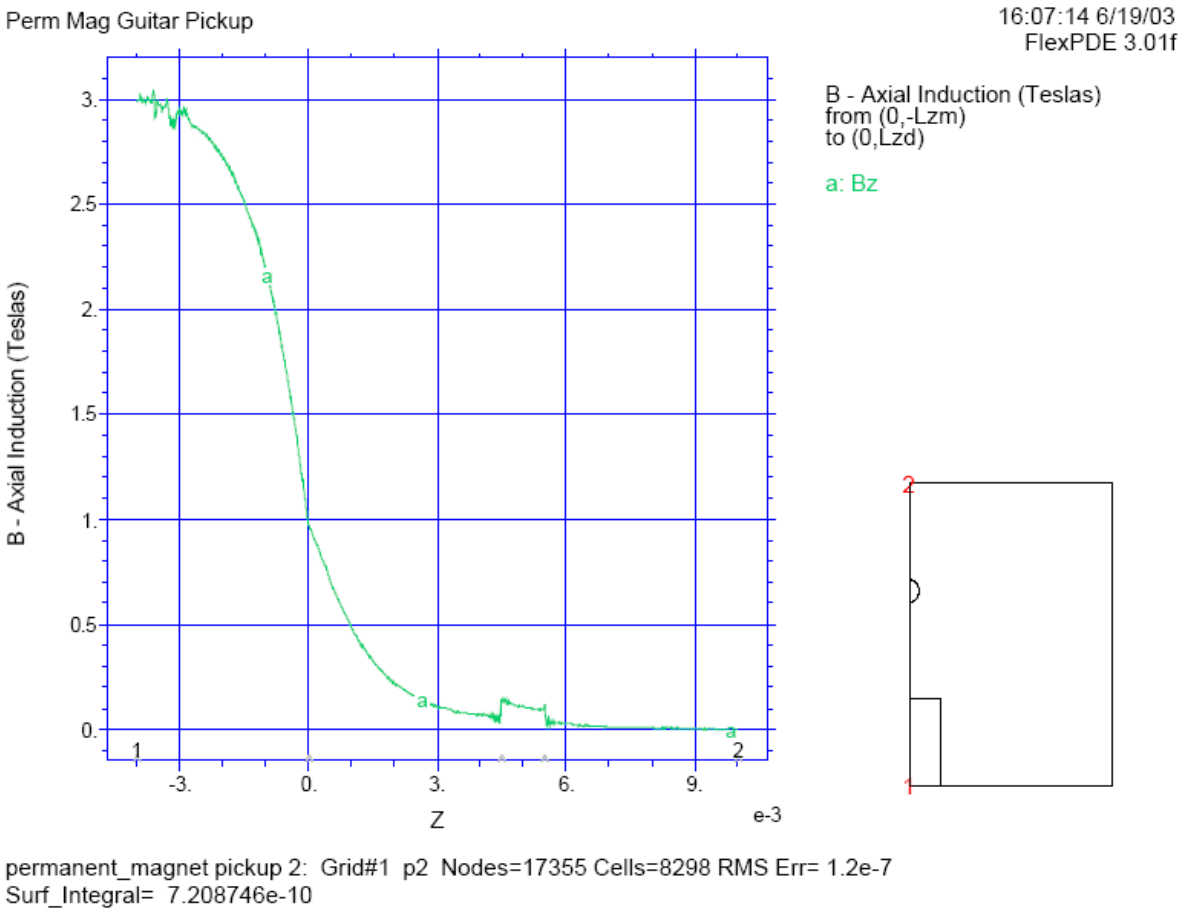

Magnitude of the Magnetic Flux Density on the System Center Line – the B field

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Perm Mag Guitar Pickup

Model Parameters

Lzm= 4.000000e-3
Rm= 1.500000e-3
Rblob= 5.000000e-4
Hblob= 5.000000e-3
muBlobrel= 5000.000
muMagrel= 8.000000
Mu0= 1.257000e-6
muBlob= 6.285000e-3
muMag= 1.005600e-5
Fblobz= -1.075670

Various Model Parameters

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Summary and Conclusions

A finite element model has been developed that allows insight into the nature and magnitude of magnetic fields in and around a guitar pickup sensor.

The model could be developed in many further ways.

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