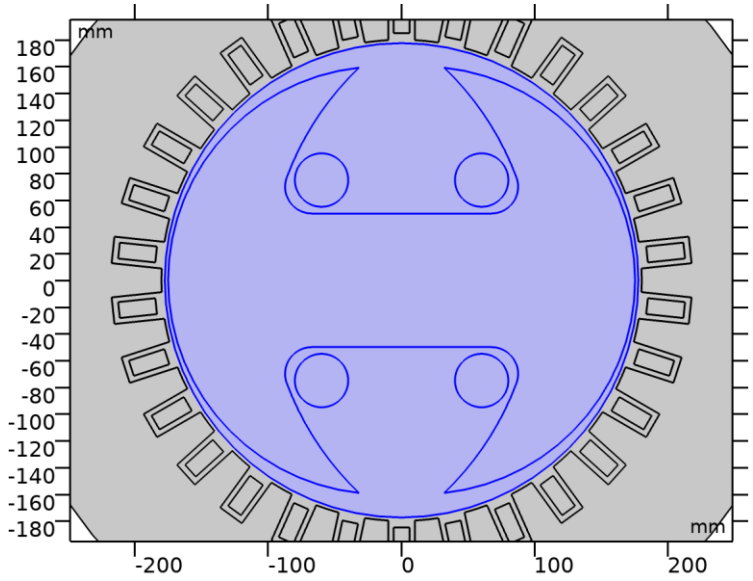
Synchronous Generator

USED PRODUCTS

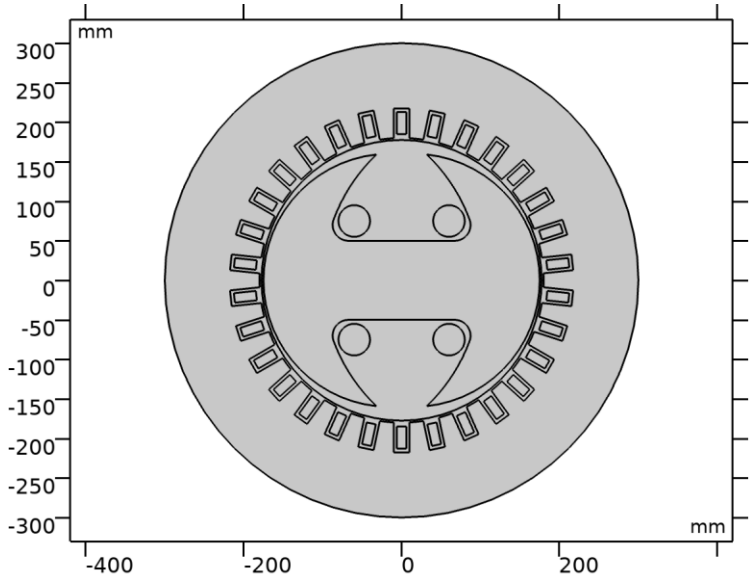
COMSOL Multiphysics
AC/DC Module

Moving Mesh



Selection

GEOMETRY 1



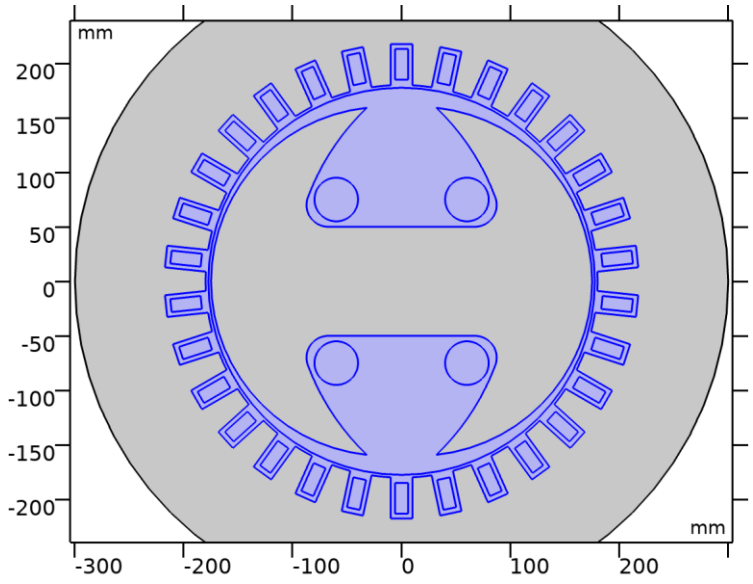
Geometry 1

UNITS

Length unit	mm
Angular unit	deg

MATERIALS

Air

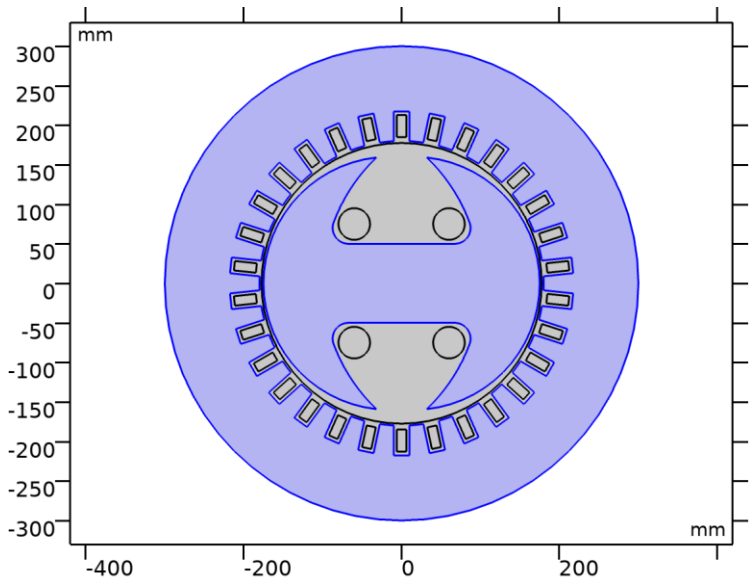


Air

SELECTION

Geometric entity level	Domain
Selection	Domains 1, 3–33, 35–38

Material 2

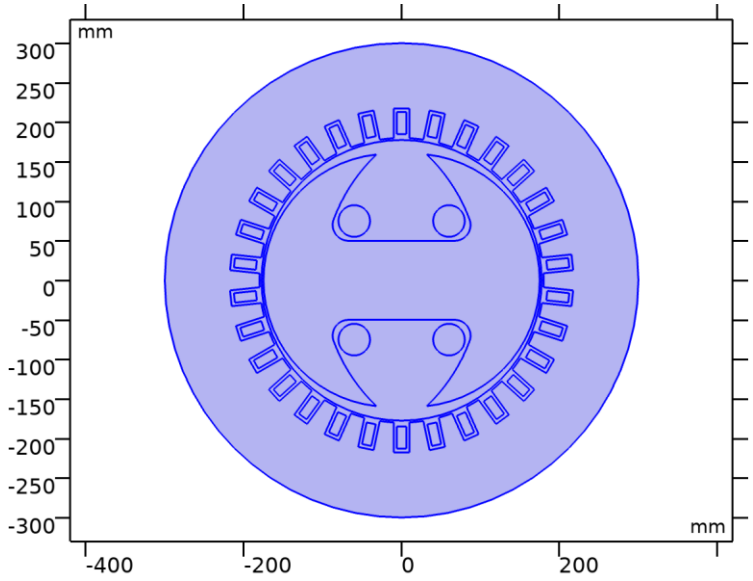


Material 2

SELECTION

Geometric entity level	Domain
Selection	Domains 2, 34

ROTATING MACHINERY, MAGNETIC



Rotating Machinery, Magnetic

EQUATIONS

Vector potential formulation (Ampère's law):

$$\nabla \times \mathbf{H} = \mathbf{J}$$

$$\mathbf{B} = \nabla \times \mathbf{A}$$

$$\mathbf{E} = -\frac{\partial \mathbf{A}}{\partial t}$$

Scalar potential formulation (Magnetic flux conservation):

$$\nabla \cdot \mathbf{B} = 0$$

Ampère's Law 1

EQUATIONS

$$\underline{\nabla \times \mathbf{H} = \mathbf{J}}$$

$$\mathbf{B} = \nabla \times \mathbf{A}$$

$$\mathbf{E} = -\frac{\partial \mathbf{A}}{\partial t}$$

$$\mathbf{J} = \sigma \mathbf{E}$$

Magnetic Insulation 1

EQUATIONS

$$\mathbf{n} \cdot \mathbf{B} = \underline{0}$$

Continuity 1

Magnetic Insulation 1

EQUATIONS

$$\mathbf{n} \cdot \mathbf{B} = \underline{0}$$

External Current Density 1

EQUATIONS

$$\mathbf{J} = \sigma \mathbf{E} + \underline{\mathbf{J}_e}$$

External Current Density 2

EQUATIONS

$$\mathbf{J} = \sigma \mathbf{E} + \underline{\mathbf{J}_e}$$

Coil A

EQUATIONS

$$\underline{\mathbf{J}_e = \frac{N I_{coil}}{A} \mathbf{e}_{coil}}$$

Coil B

EQUATIONS

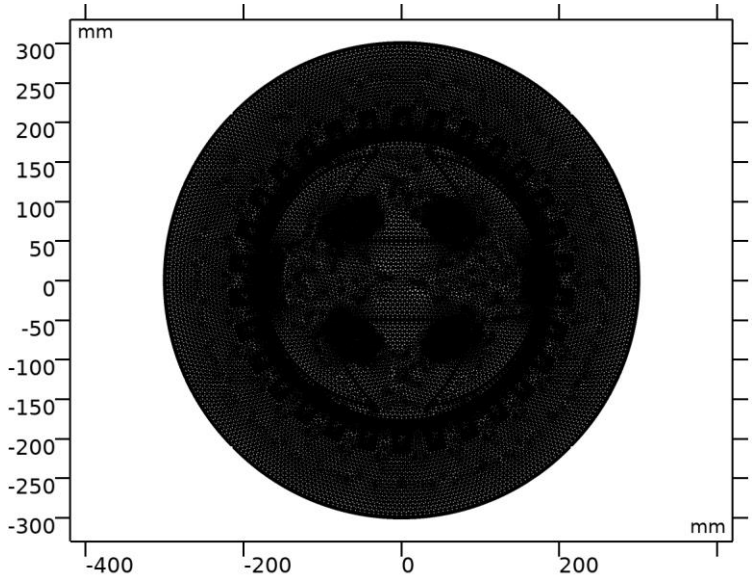
$$\underline{\mathbf{J}_e = \frac{N I_{coil}}{A} \mathbf{e}_{coil}}$$

Coil C

EQUATIONS

$$\underline{\mathbf{J}_e = \frac{N I_{coil}}{A} \mathbf{e}_{coil}}$$

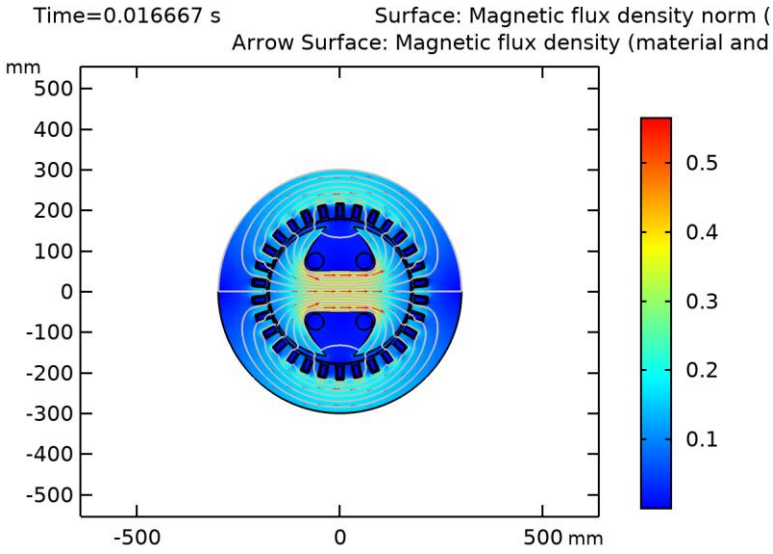
MESH 1



Mesh 1

Results

Magnetic Flux Density (rmm)



Surface: Magnetic flux density norm (T) Arrow Surface: Magnetic flux density (material and geometry frames)