(Thesis 1) SIMULATIONS AND IMPLEMENTATION OF MAGNETIC MICROGRIPPERS FOR THE REMOVAL OF TEXTILE DYES IN WASTEWATERS

Universidad de los Andes | BIOMICROSYSTEMS

OBJECTIVES AND SCOPE

Simulation and implementation of biomicromechanical devices for the removal of textile dyes from wastewaters.

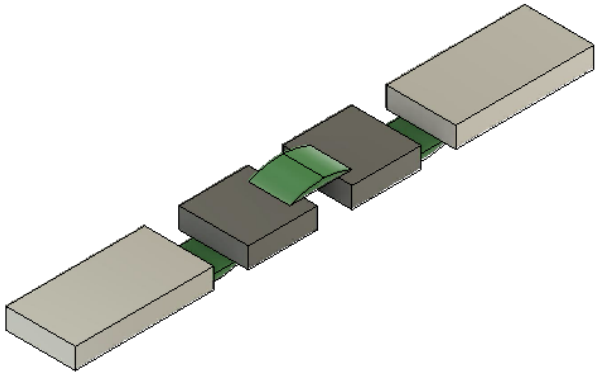
Specific (Tesis 1)

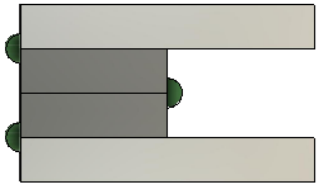
- Select materials and appropriate surface functionalization strategies to conduct textile dyes removal processes from wastewaters.

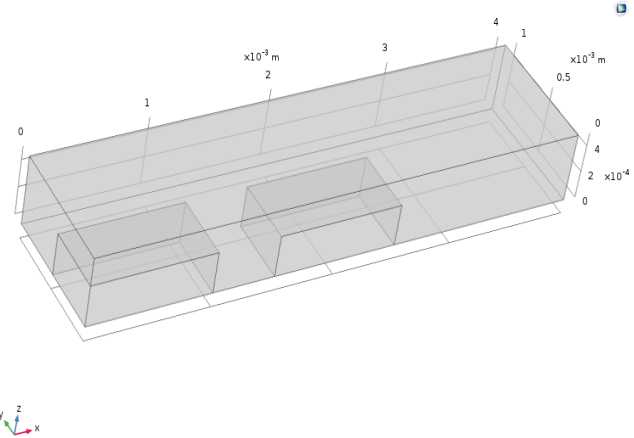
- Engineer the geometry and simulate selected materials with suitable capacity to be implemented in the microstructures.

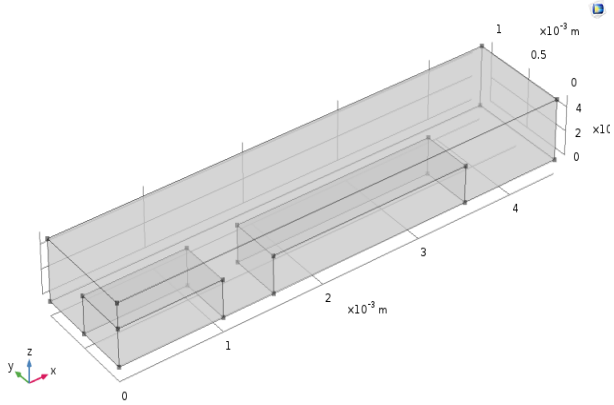
- Use software to simulate magnetic and mechanical responses of the microstructures and interactions among themselves.

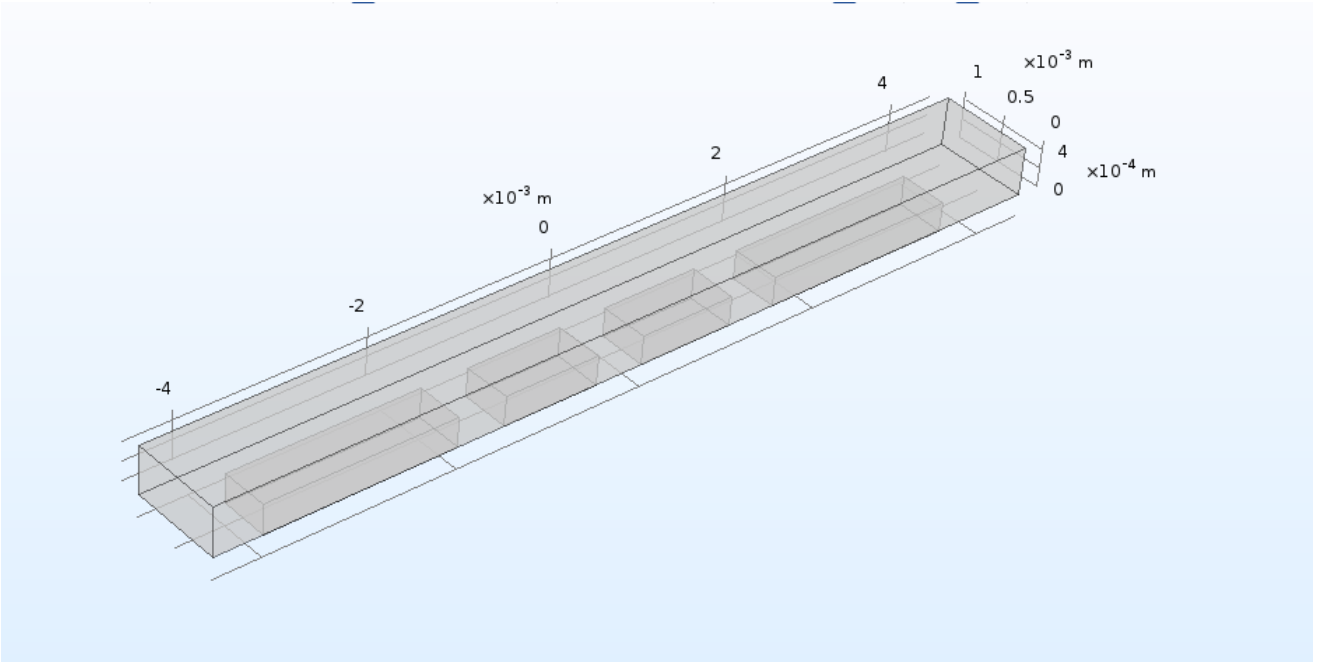
Inicial draft



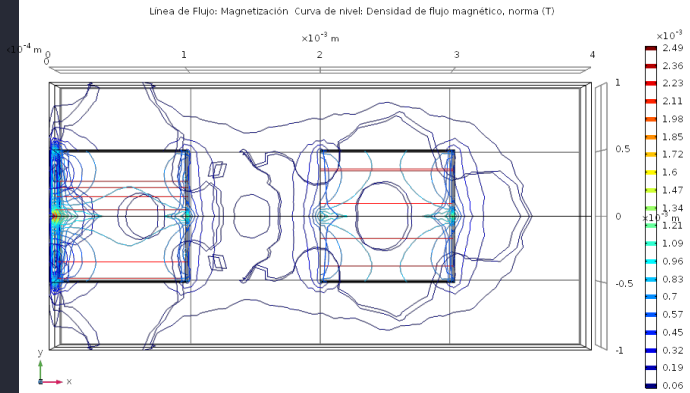


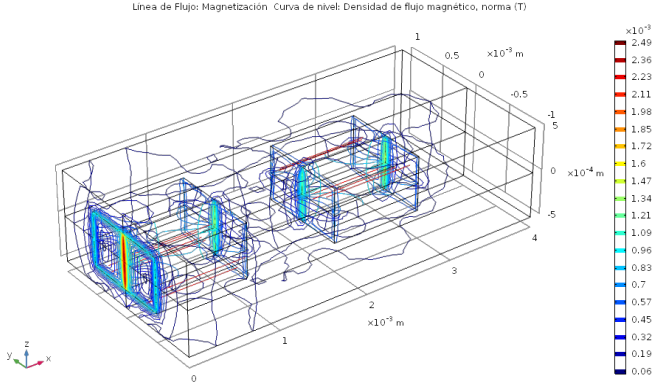


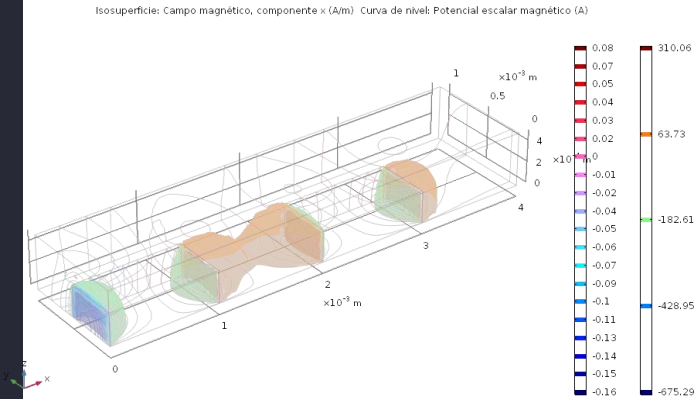


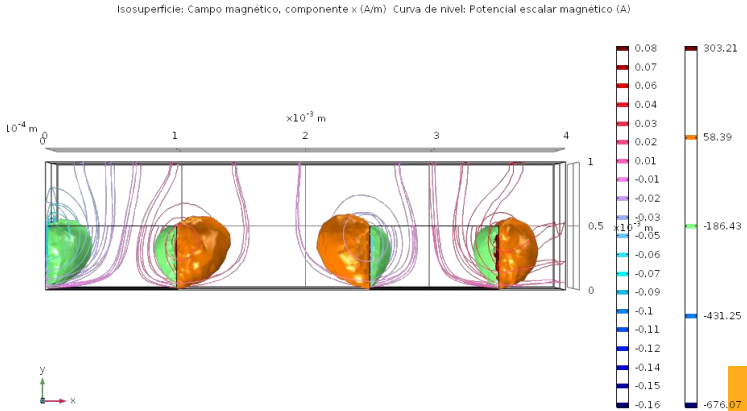

×10-3 m
4
2
0
-2
-4
×10-3 m
1
0.5
0
×10-4 m
4
0

Magnet - Magnet

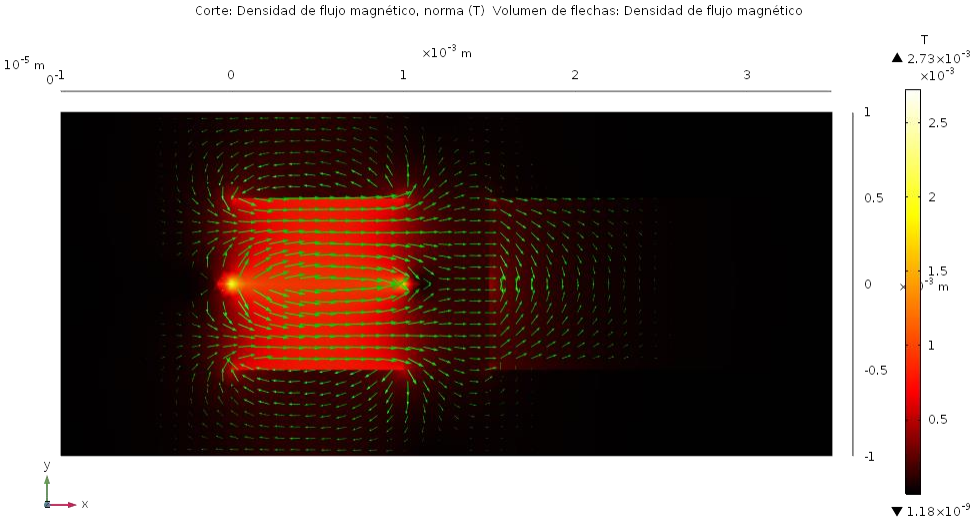


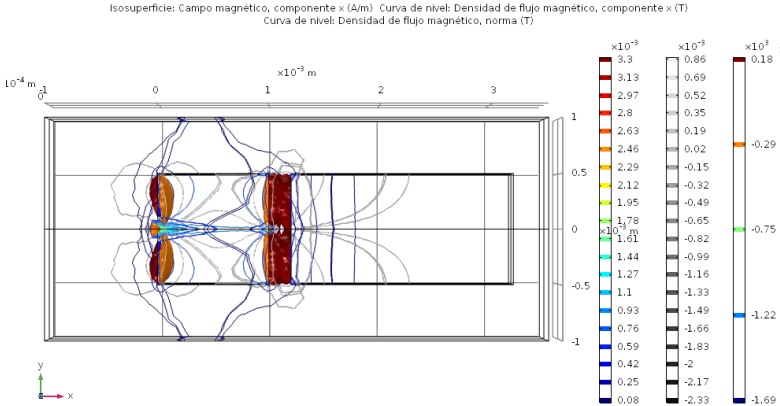


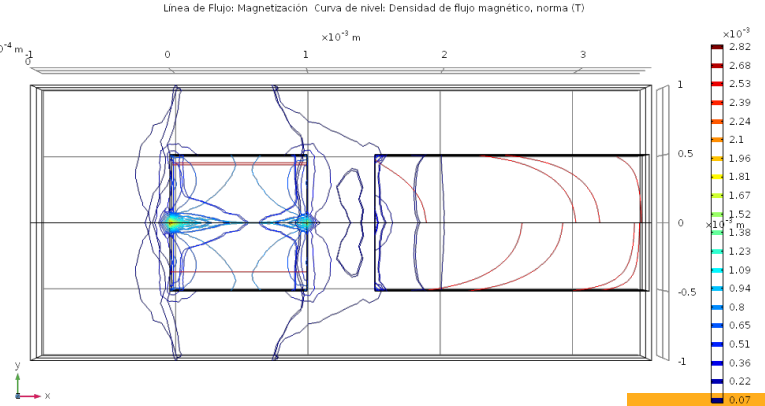


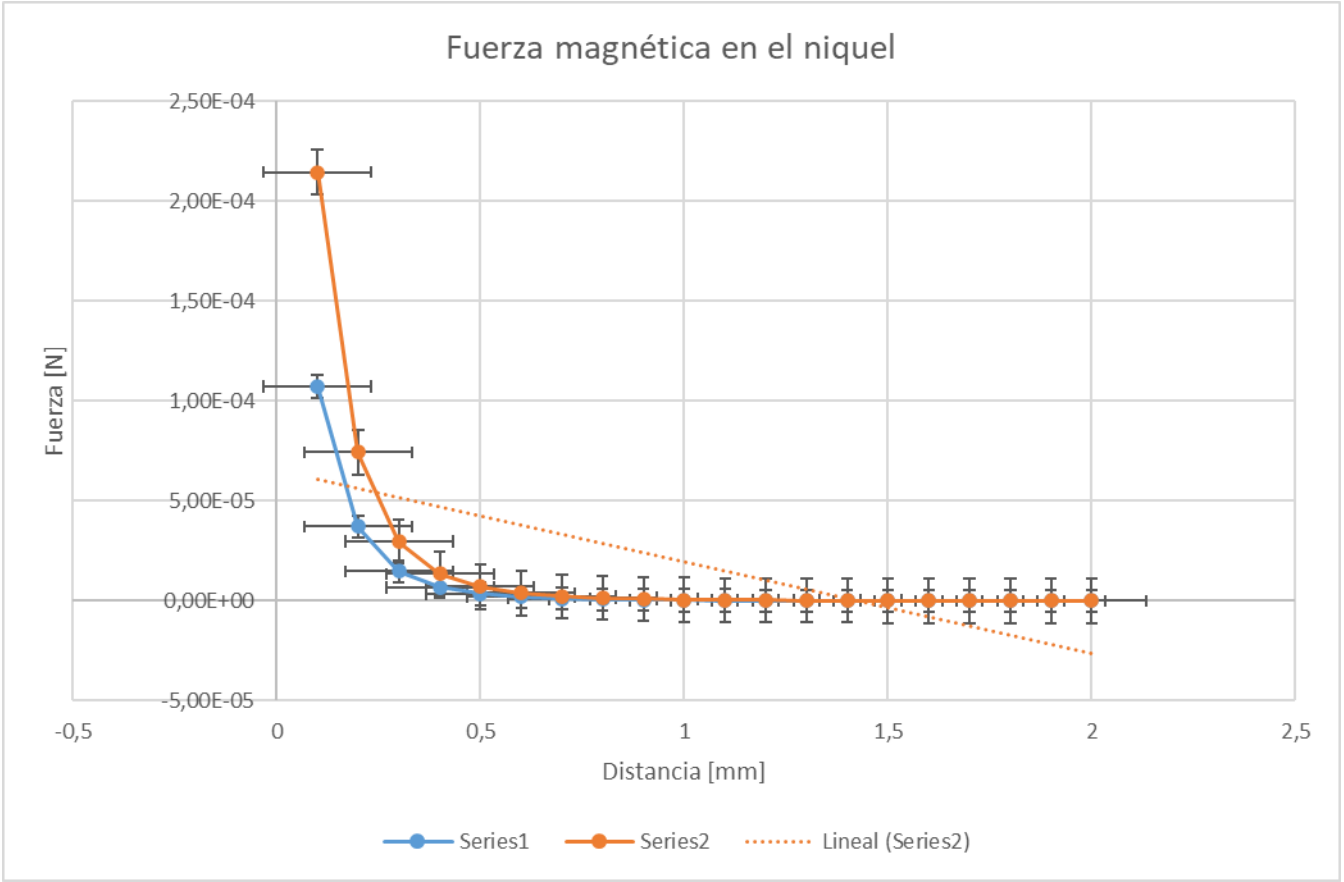


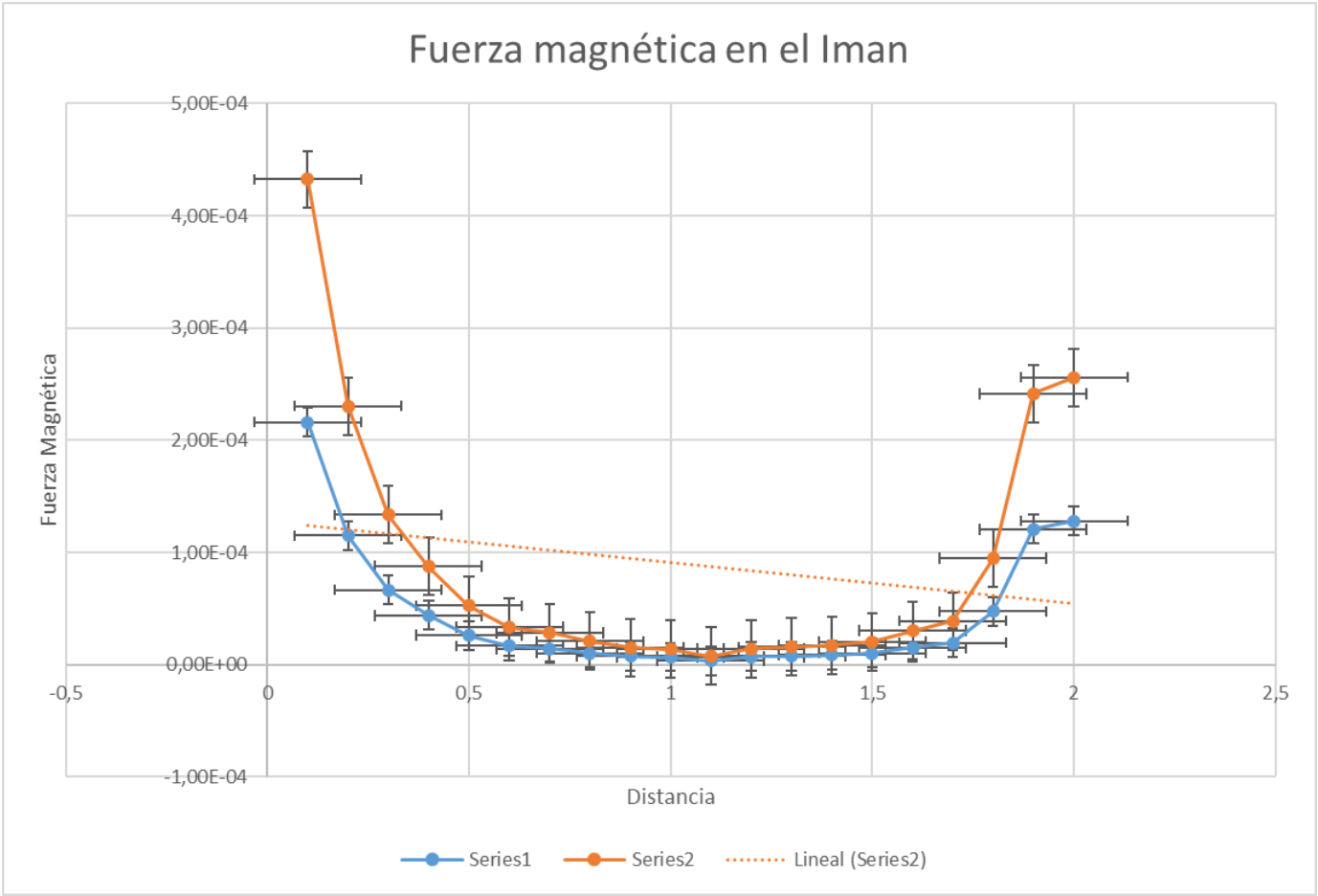
Magnet - Niquel

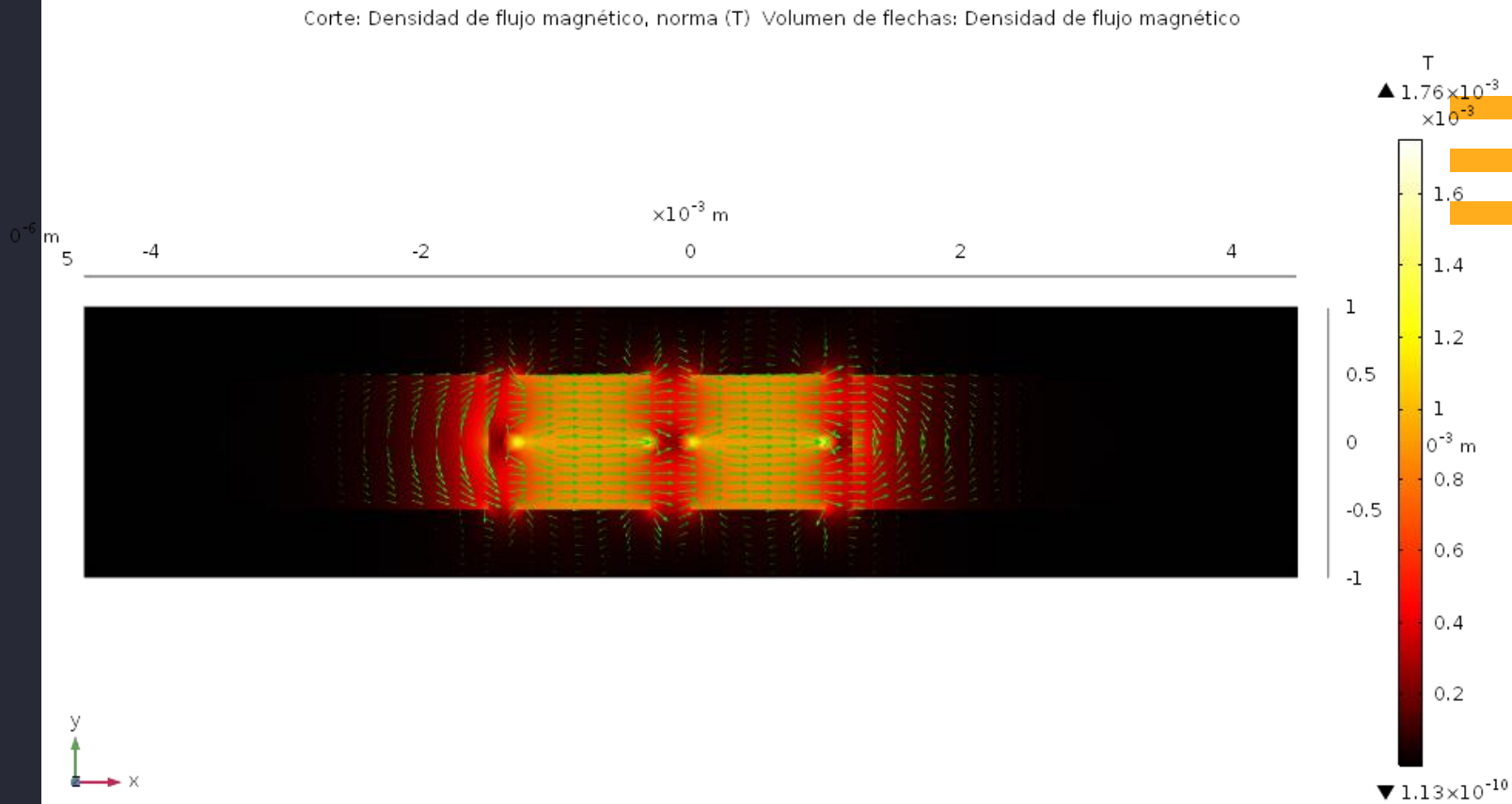


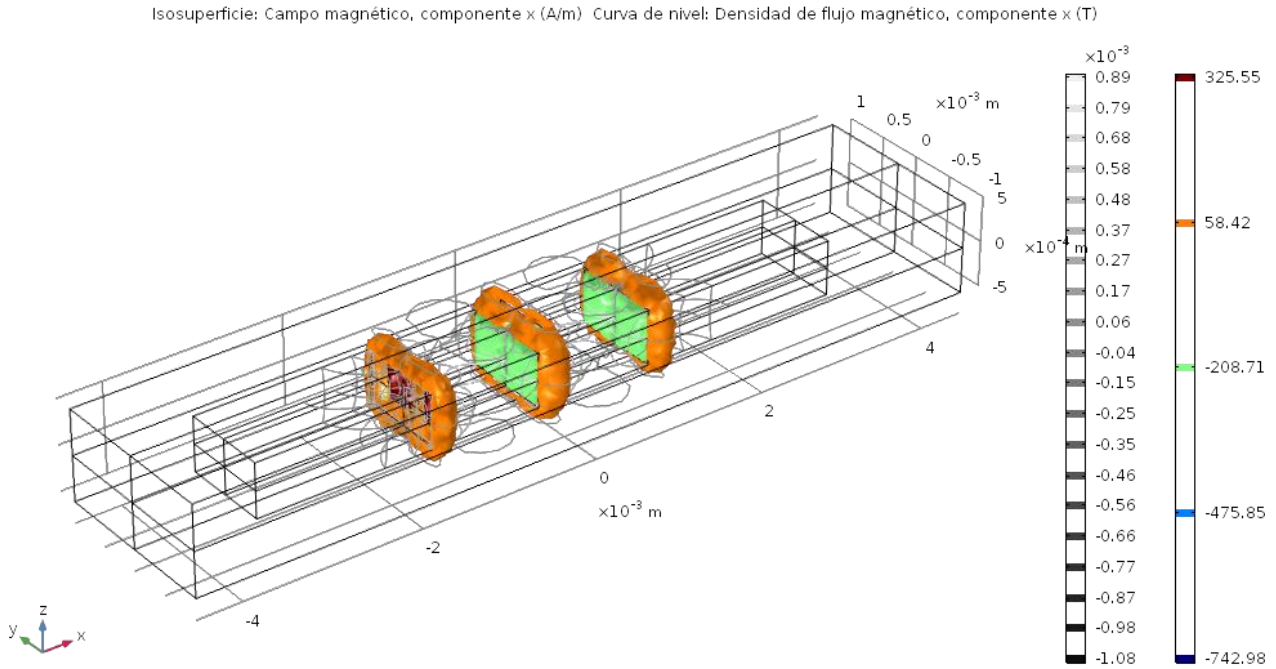


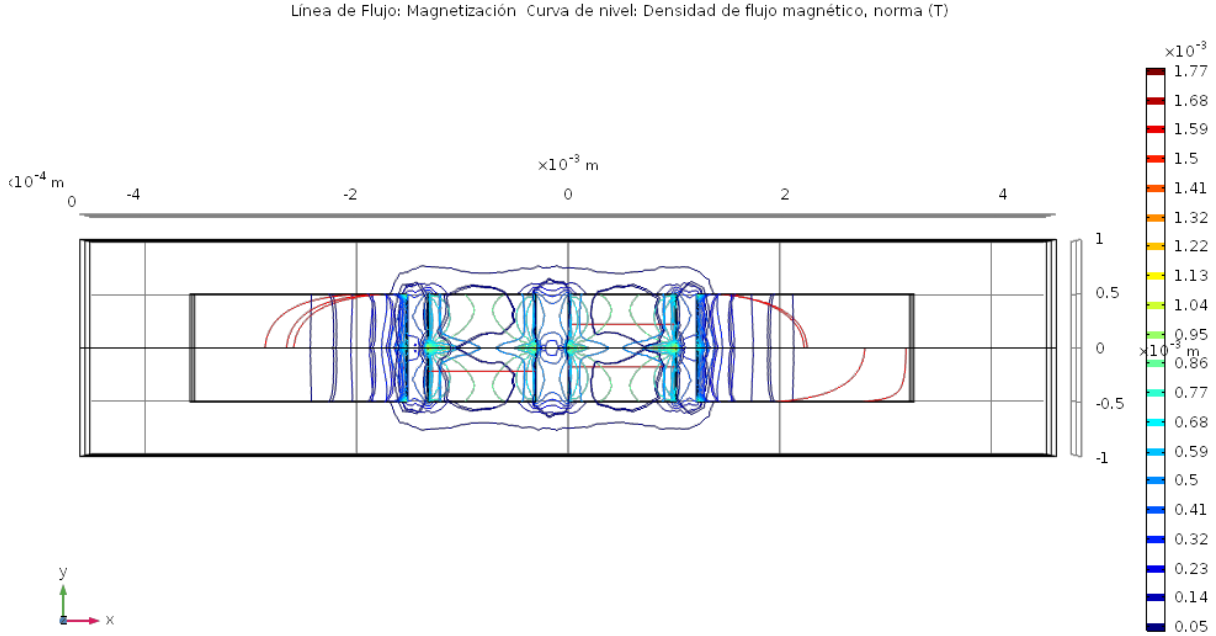


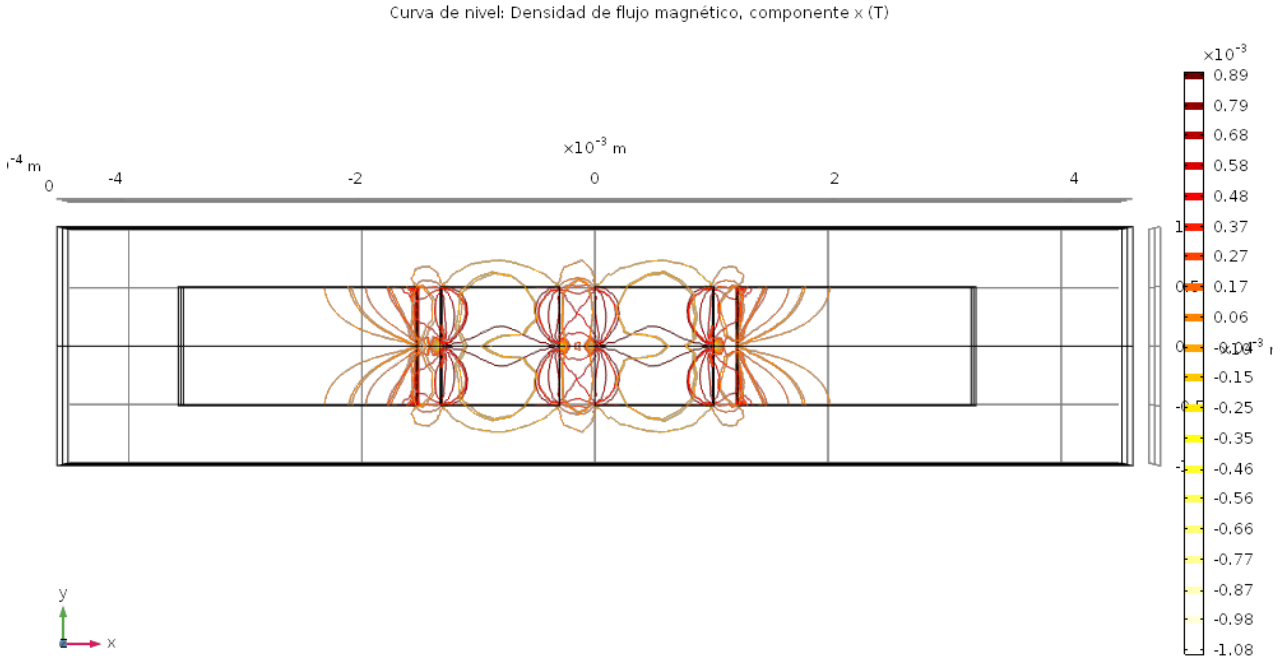

Fuerza magnética en el niquel
2,50E-04
2,00E-04
1,50E-04
1,00E-04
5,00E-05
0,00E+00
-5,00E-05
Fuerza [N]
-0,5
0
0,5
1
1,5
2
2,5
Distancia [mm]
Series1
Series2
Lineal (Series2)


Fuerza magnética en el Iman
5,00E-04
4,00E-04
3,00E-04
2,00E-04
1,00E-04
0,00E+00
-1,00E-04
Fuerza Magnética
-0,5
0
0,5
1
1,5
2
2,5
Distancia
Series1
Series2
Lineal (Series2)

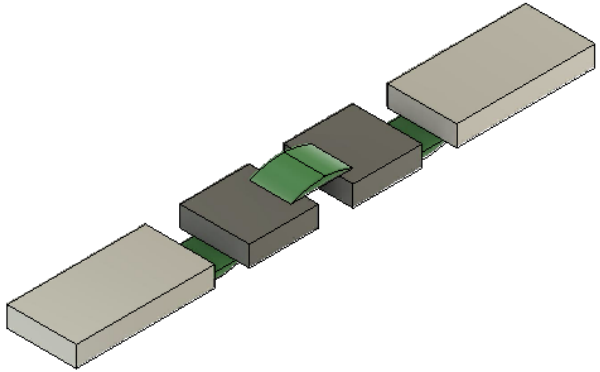

Corte: Densidad de flujo magnético, norma (T) Volumen de flechas: Densidad de flujo magnético
T
▲ 1.76×10^-3
×10^-3
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0^-3 m
▼ 1.13×10^-10
×10^-3 m
-4
-2
0
2
4
0^-6 m
5
1
0.5
0
-0.5
-1
y
x

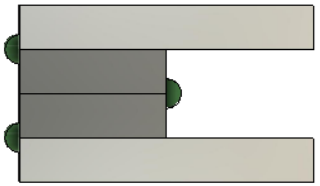

Isosuperficie: Campo magnético, componente x (A/m) Curva de nivel: Densidad de flujo magnético, componente x (T)
×10⁻³ m
1
0.5
0
-0.5
-1
5
0
-5
×10⁻⁴ m
4
2
0
-2
-4
×10⁻³ m
z
y
x
×10⁻³
0.89
0.79
0.68
0.58
0.48
0.37
0.27
0.17
0.06
-0.04
-0.15
-0.25
-0.35
-0.46
-0.56
-0.66
-0.77
-0.87
-0.98
-1.08
325.55
58.42
-208.71
-475.85
-742.98

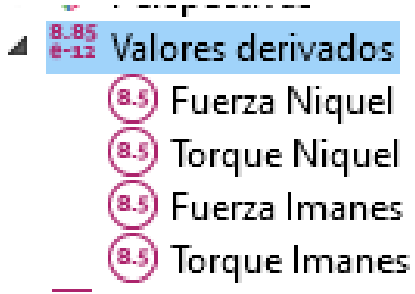

Línea de Flujo: Magnetización Curva de nivel: Densidad de flujo magnético, norma (T)
×10^-4 m
0
×10^-3 m
-4
-2
0
2
4
1
0.5
0
-0.5
-1
×10^-3
1.77
1.68
1.59
1.5
1.41
1.32
1.22
1.13
1.04
0.95
×10^-3 m
0.86
0.77
0.68
0.59
0.5
0.41
0.32
0.23
0.14
0.05
y
x

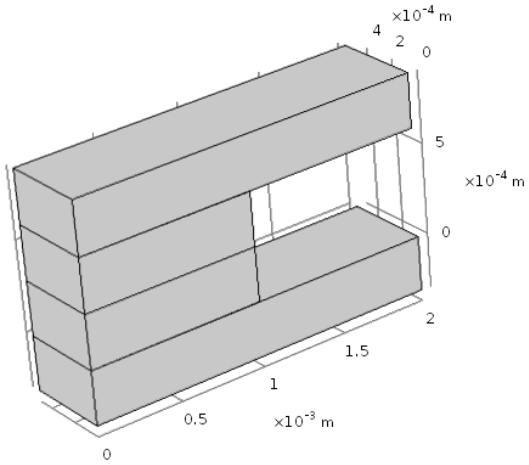

Curva de nivel: Densidad de flujo magnético, componente x (T)
×10^-3 m
-4
-2
0
2
4
×10^-3
0.89
0.79
0.68
0.58
0.48
0.37
0.27
0.17
0.06
-0.04
-0.15
-0.25
-0.35
-0.46
-0.56
-0.66
-0.77
-0.87
-0.98
-1.08
y
x

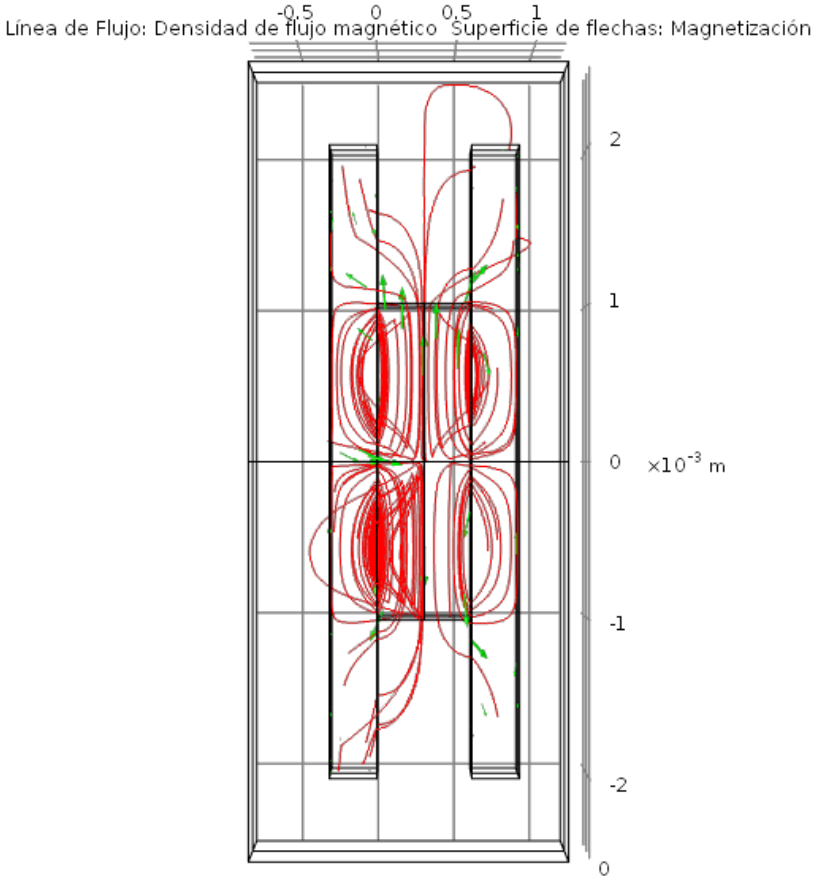
Following work

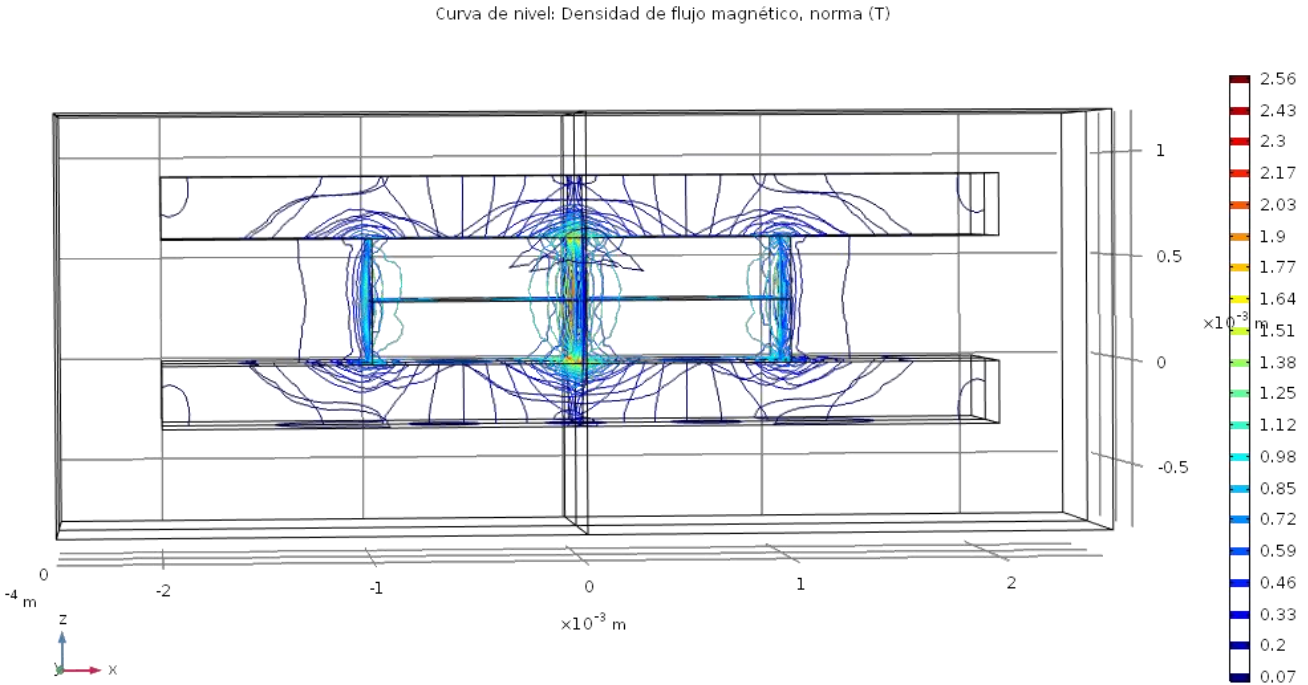


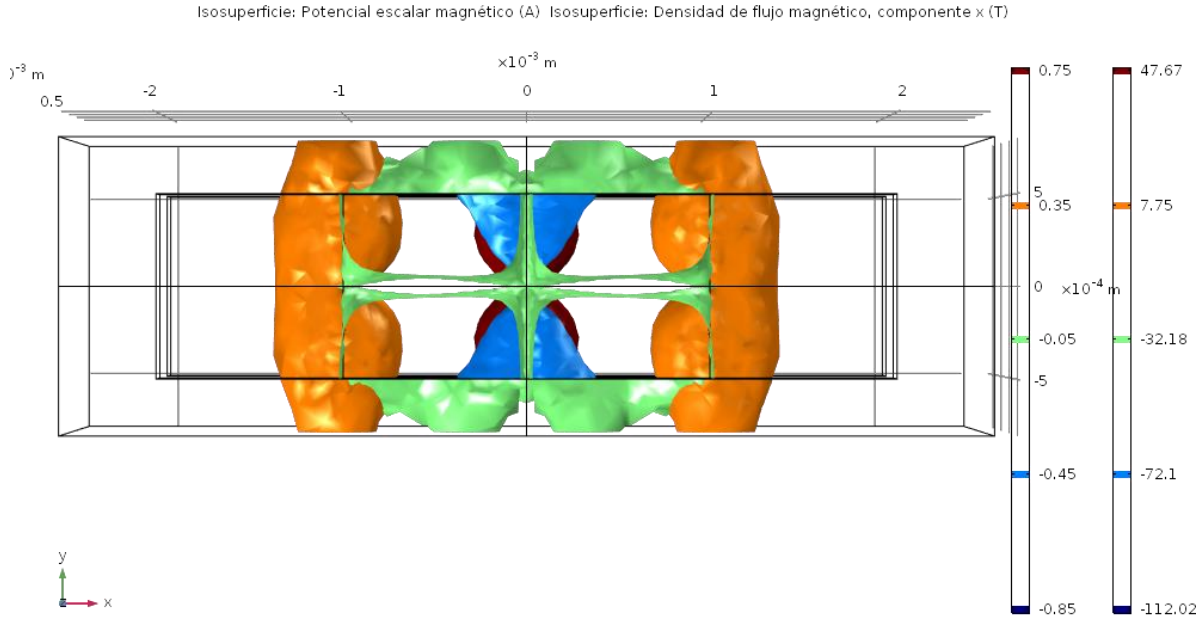





×10^-4 m
4
2
0
5
×10^-4 m
0
2
1.5
1
0.5
×10^-3 m
0
z
y
x


Línea de Flujo: Densidad de flujo magnético Superficie de flechas: Magnetización
-0.5
0
0.5
1
2
1
0
-1
-2
0
×10^-3 m
x
z


Curva de nivel: Densidad de flujo magnético, norma (T)
2.56
2.43
2.3
2.17
2.03
1.9
1.77
1.64
1.51
1.38
1.25
1.12
0.98
0.85
0.72
0.59
0.46
0.33
0.2
0.07
×10⁻³ m
1
0.5
0
-0.5
0
-4 m
-2
-1
0
1
2
×10⁻³ m
z
y
x


Isosuperficie: Potencial escalar magnético (A) Isosuperficie: Densidad de flujo magnético, componente x (T)
×10^-3 m
-2
-1
0
1
2
0.5
0.75
0.35
0
-0.05
-0.45
-0.85
×10^-4 m
47.67
7.75
-32.18
-72.1
-112.02
y
x

Thanks!

Any questions?