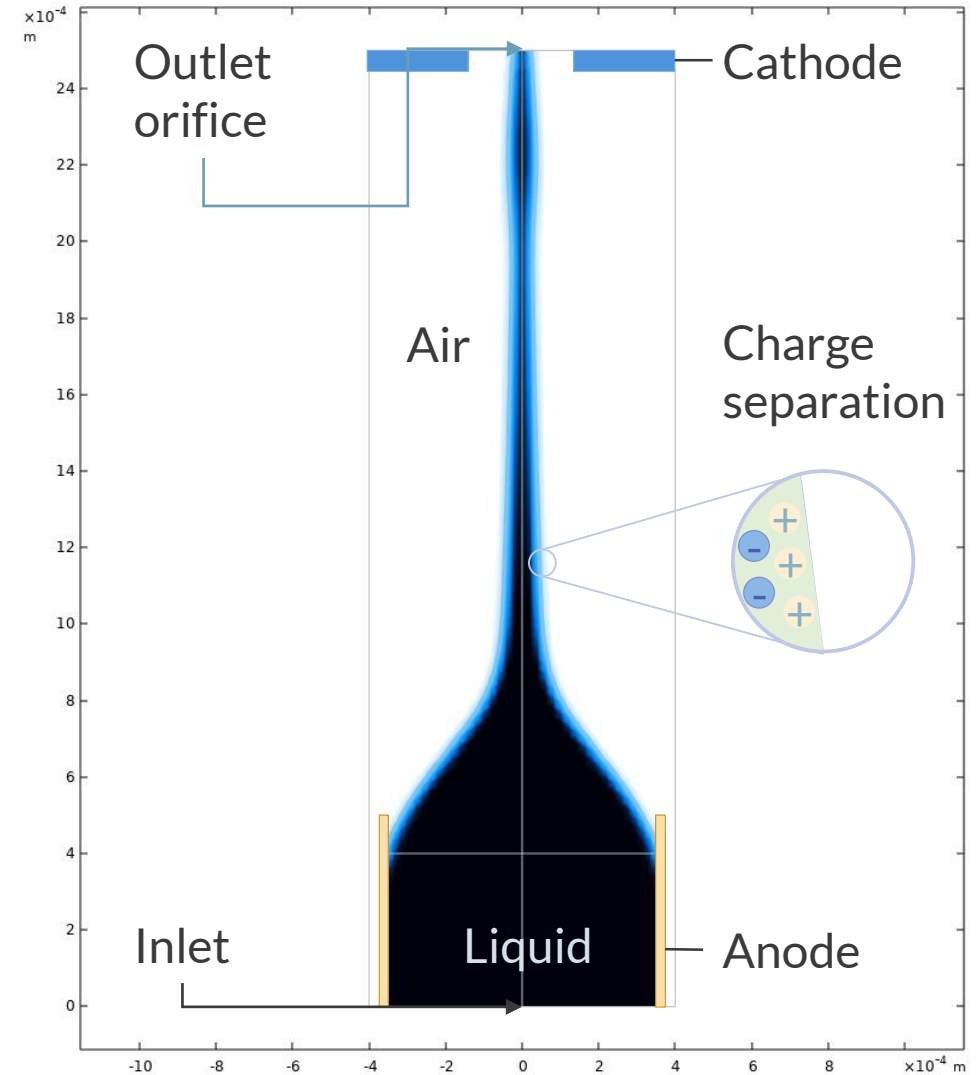


# Taylor Cone

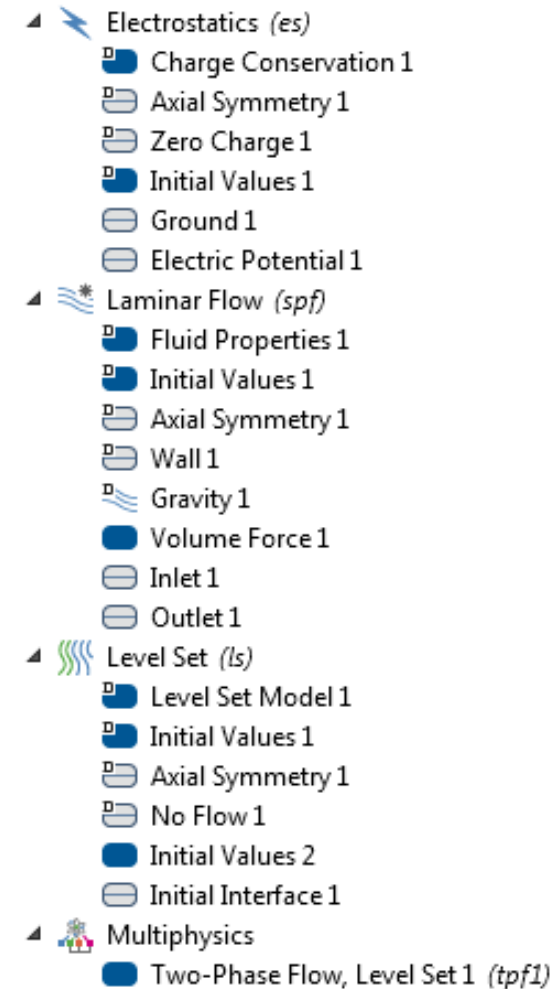
# Model Definition

- Water-air interface
- Applied electric field over anode and cathode
- Gravity
- Axi-symmetry



# Physics Interfaces

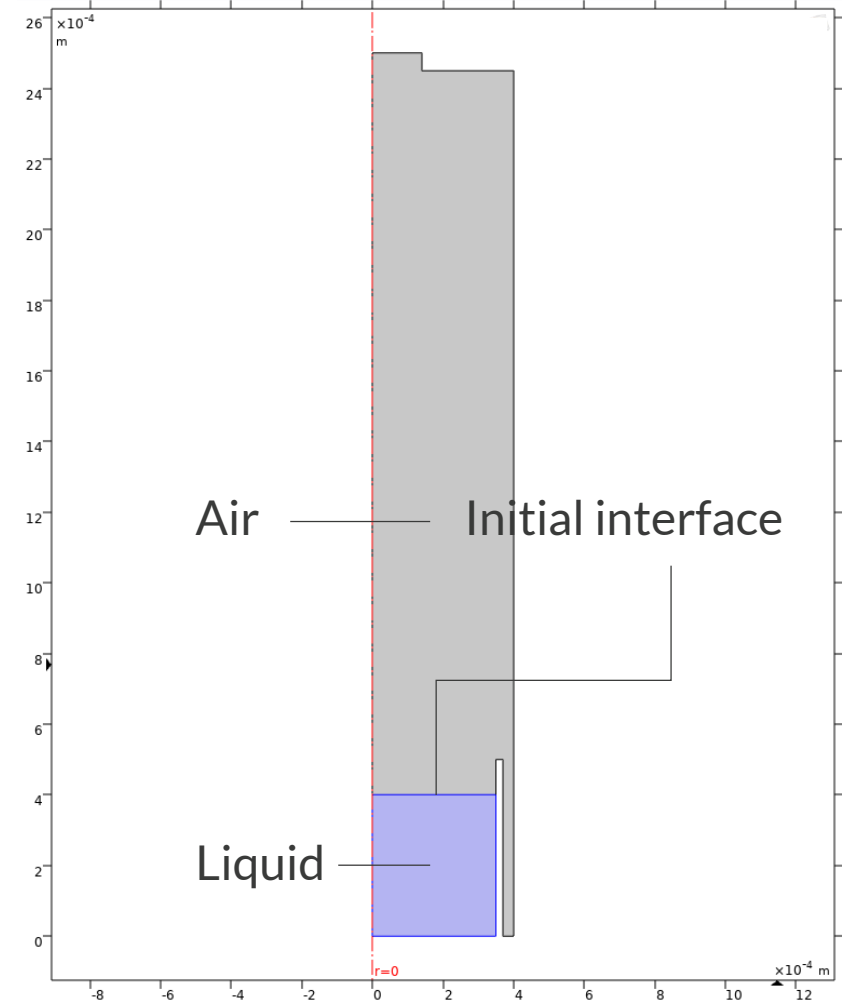
- Laminar Flow
  - Volume force from electric field
- Level Set
- Electrostatics
- Multiphysics couplings:
  - Two-Phase Flow



*The model tree*

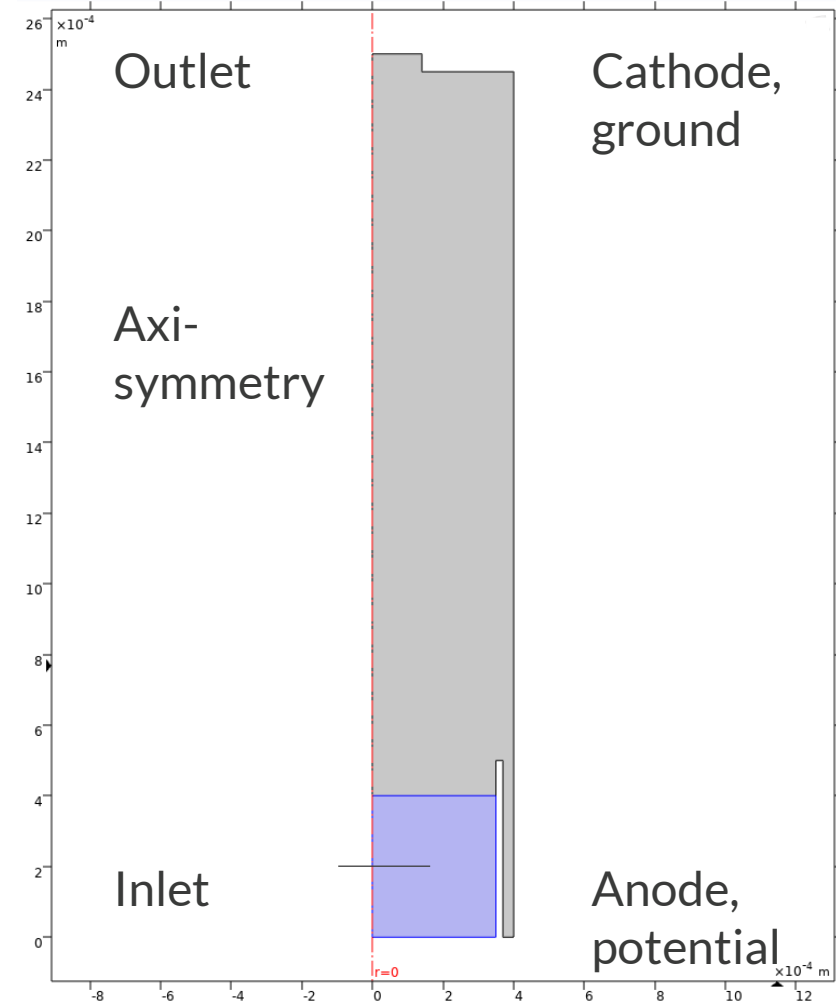
# Initial Conditions

- Laminar Flow
  - No velocity
  - Pressure gradient with gravity
- Level Set
  - Initial interface position
- Electrostatics
  - No electric field
- Multiphysics coupling
  - Water and air



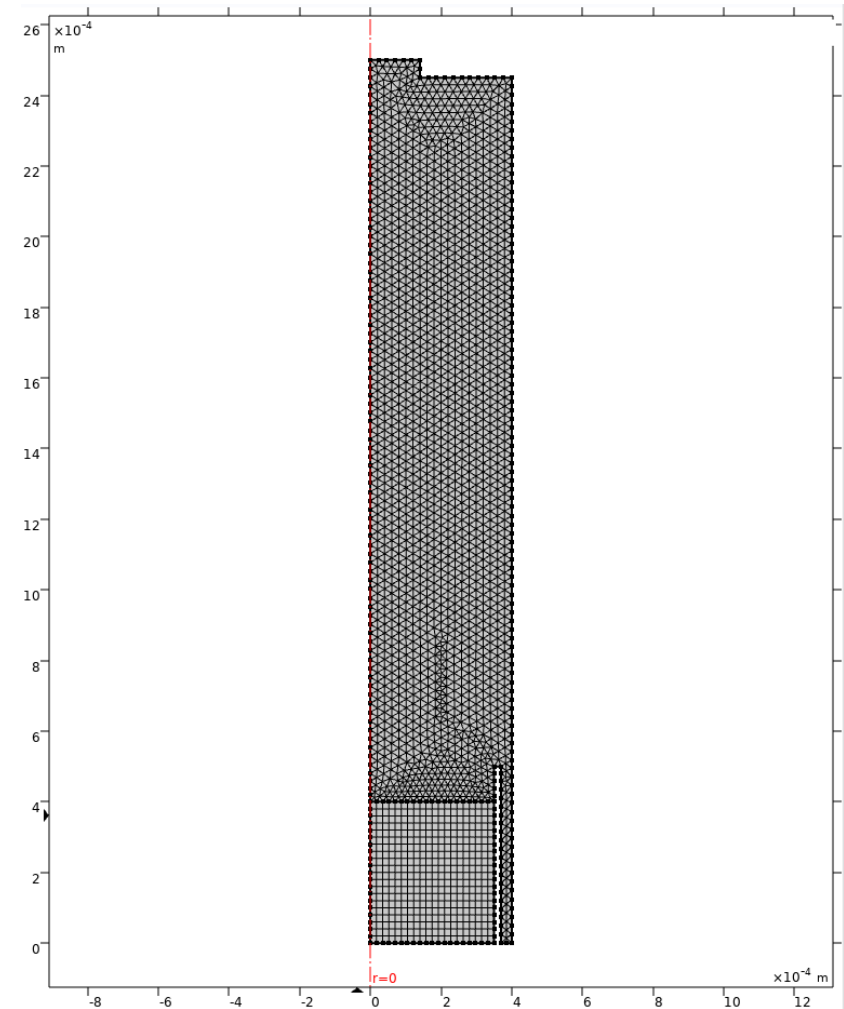
# Boundary Conditions

- Laminar Flow
  - Increasing velocity at inlet until constant steady value
  - Constant pressure at outlet
  - Walls
- Level set
  - Inlet and outlet conditions
- Electrostatics
  - Increasing anode potential with time until steady value
- Multiphysics
  - Wetted wall

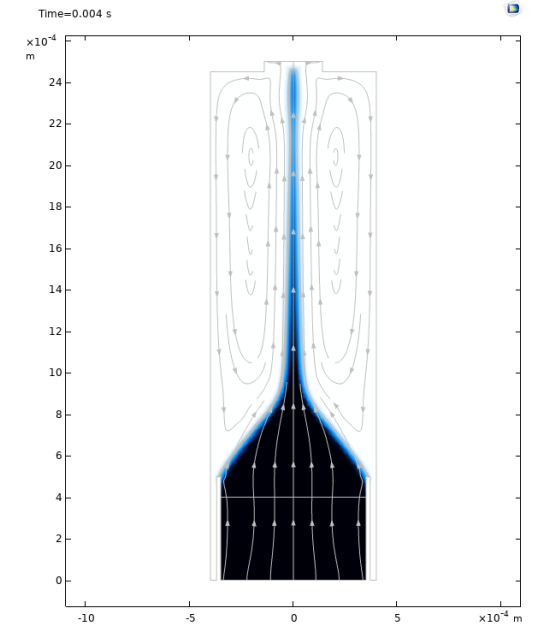
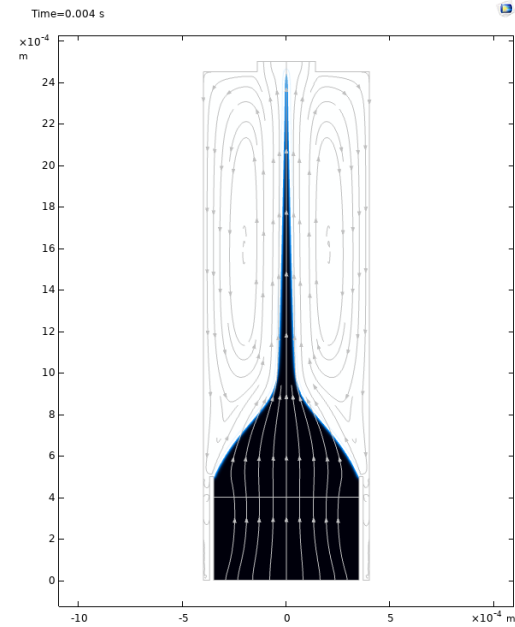
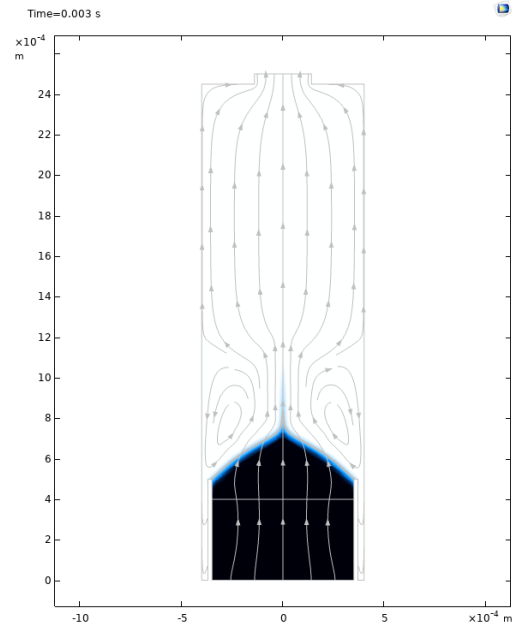
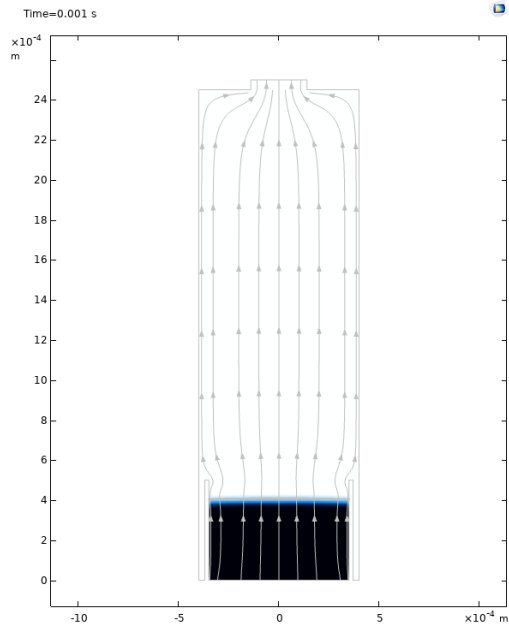


# Mesh

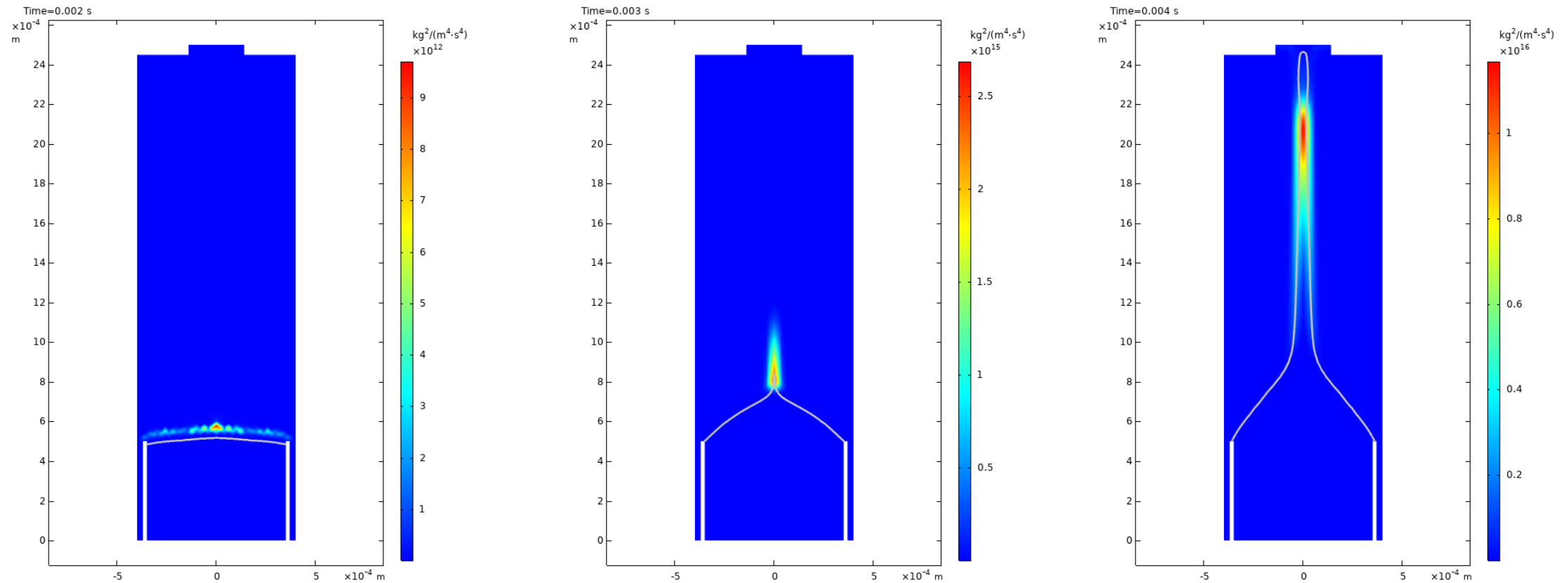
- Mesh fine enough to resolve interface thickness
- Mapped mesh in the initial domain of the liquid
- Triangular mesh in all other domains



# Results: Velocity Field and Surface



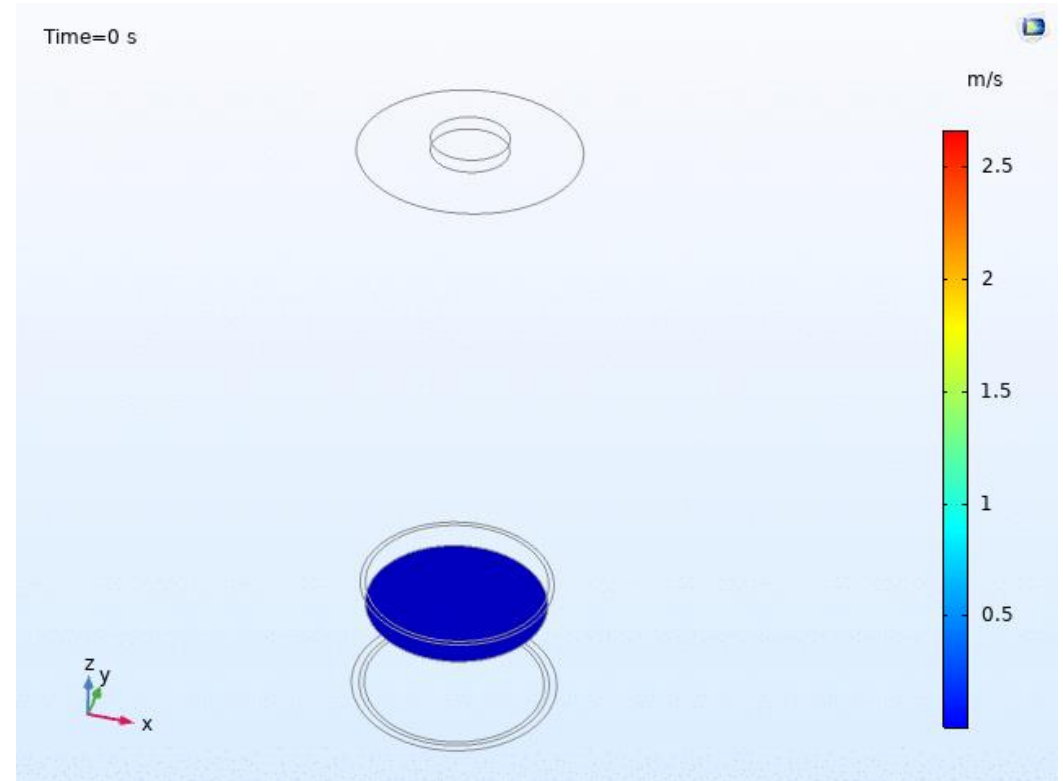
# Results: Electrostatic Volume Force





# Results: Animation

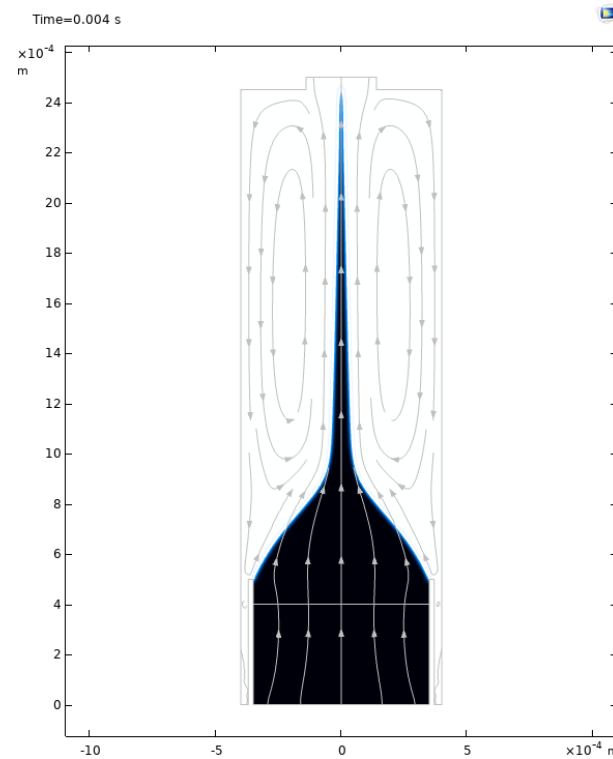
- Surface:
  - Liquid surface
- Color:
  - Flow velocity



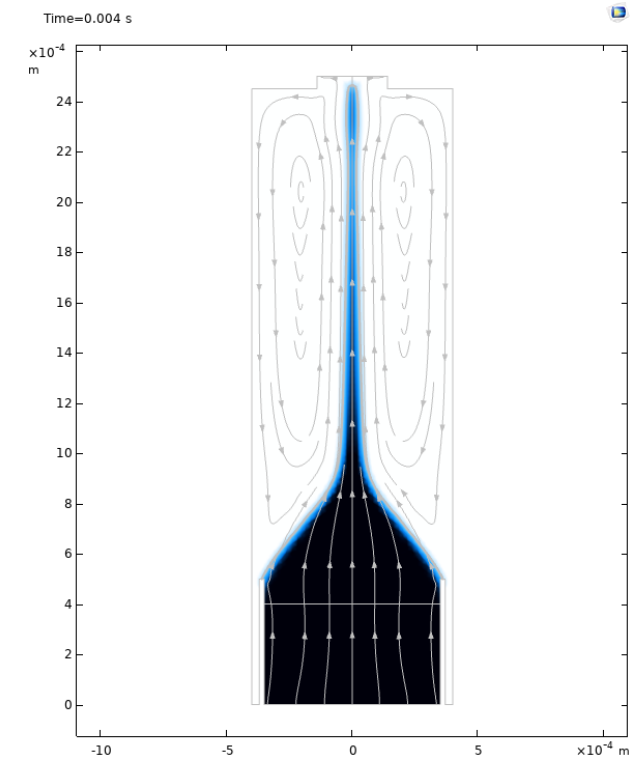
# Conclusions

- Interface position:
  - Relatively good agreement between mesh cases
- Small influence of gravity

Extra fine mesh

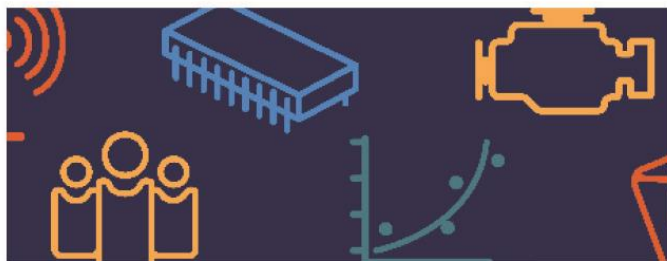


Fine mesh

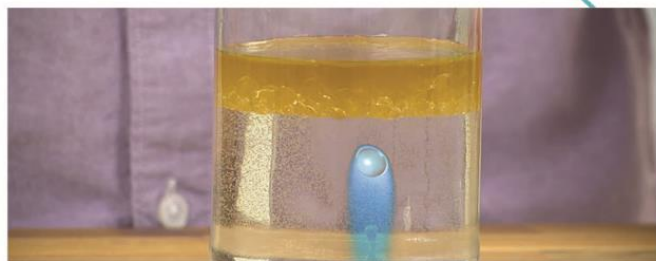


# Further Resources for Inspiration

comsol.com



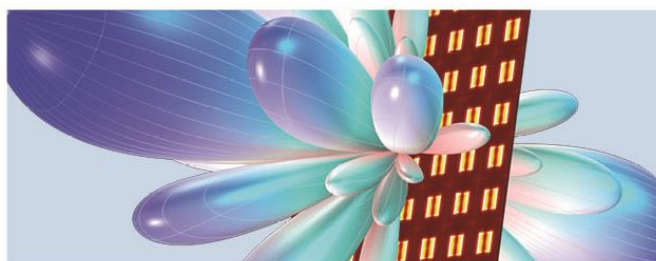
BLOG POSTS



VIDEOS

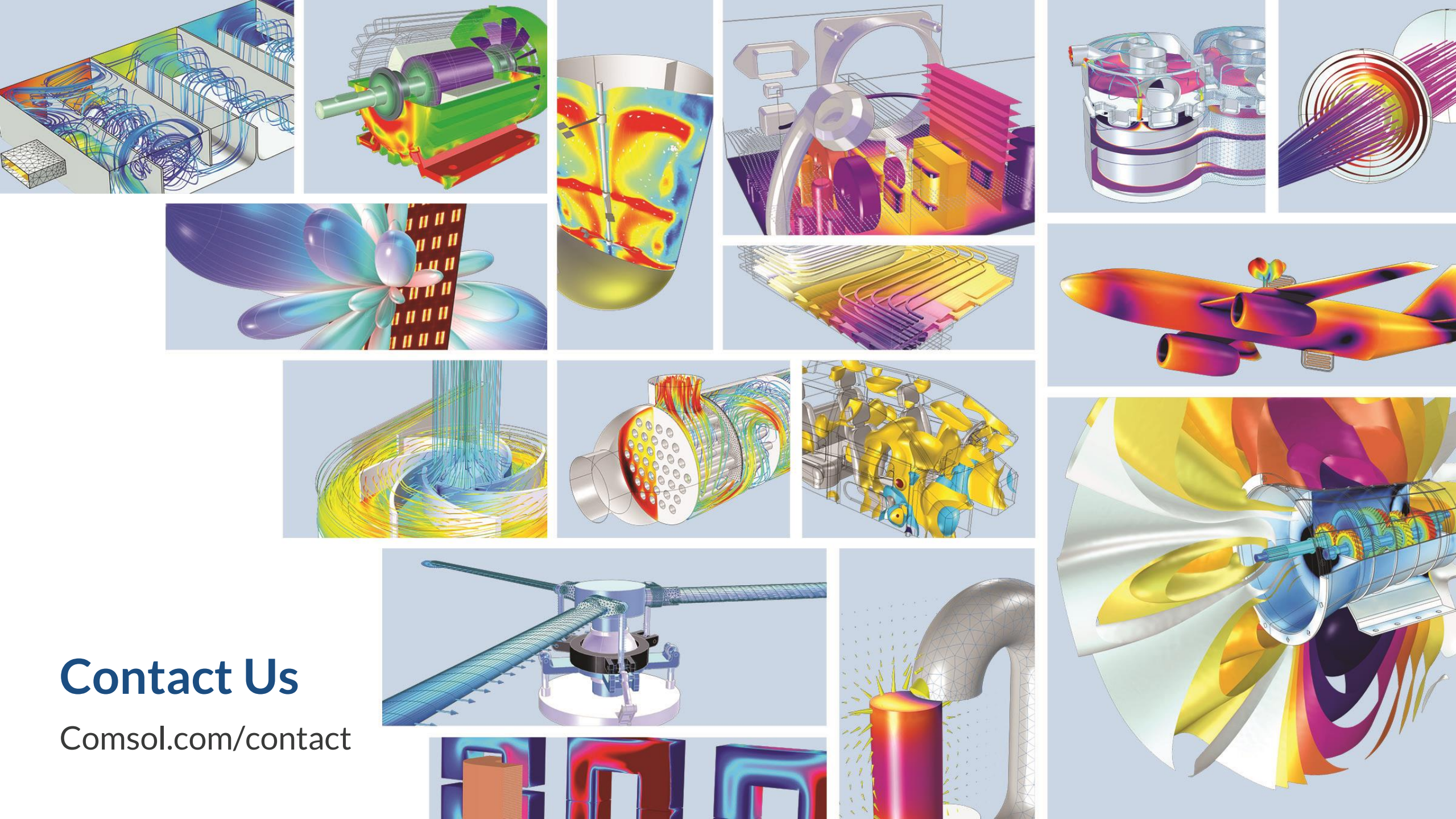


USER STORIES



MODELS & APPLICATIONS





Contact Us

[Comsol.com/contact](https://comsol.com/contact)