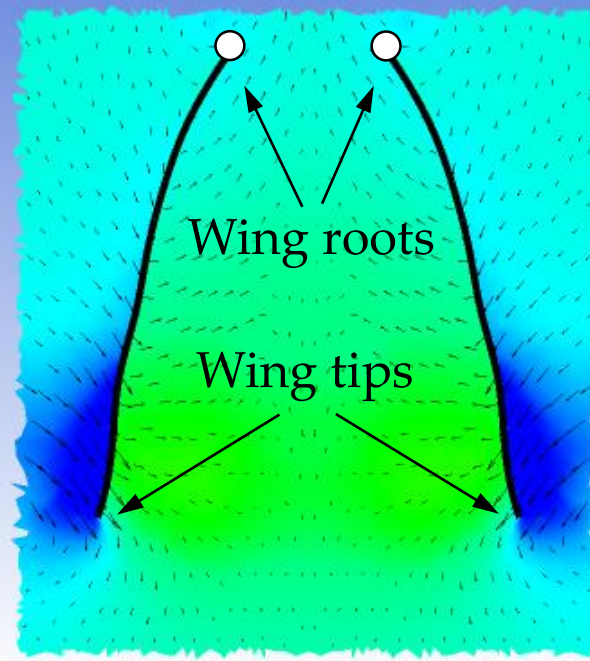


Figure S3: Flow fields in $50\%c_m$ -plane during down-stroke reversal. For all values of J , the wing distance is 16 mm. The black curves are the intersections between the wings and the plane. The wing roots are marked with white circles.

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=0$

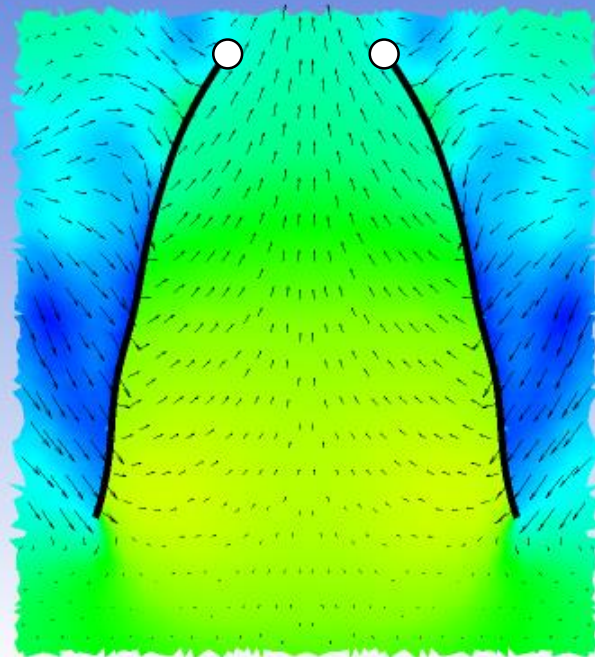


$t/T=0.21$

ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

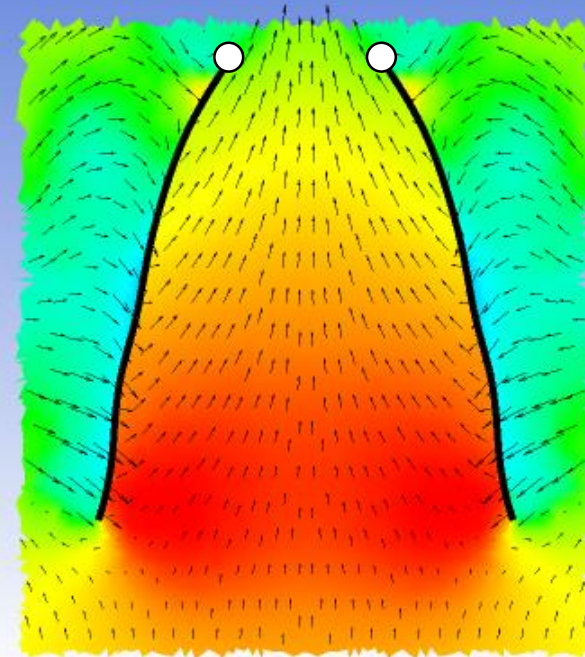
$J=0.5$



ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

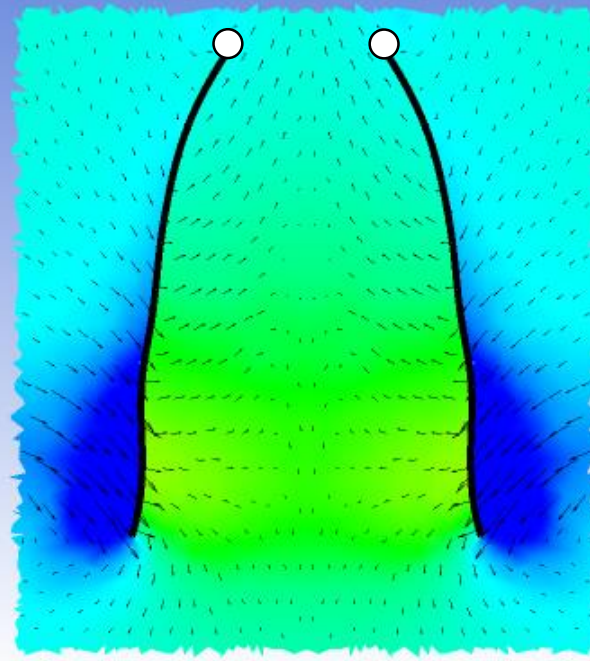
$J=1$



ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=0$

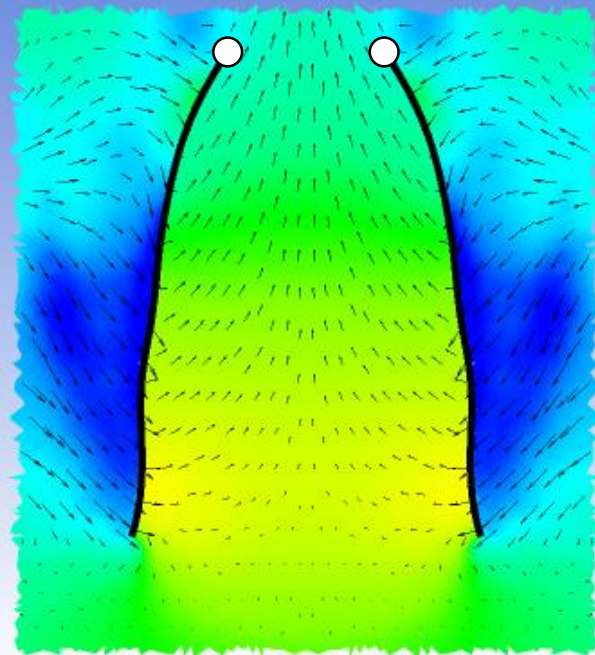


$t/T=0.22$

ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

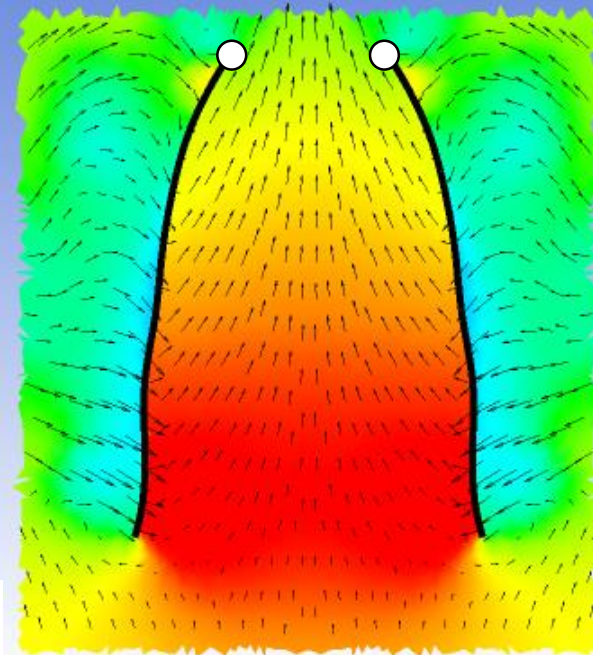
$J=0.5$



ANSYS
R16.2
Azimuthal

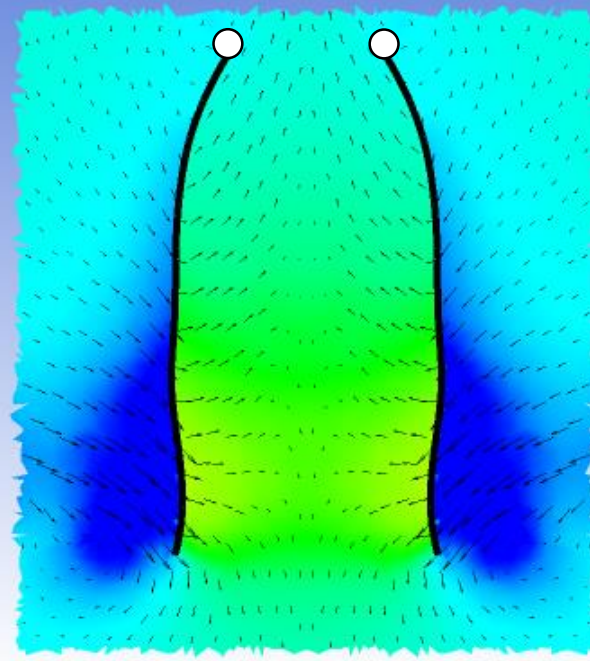
Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=1$



Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=0$

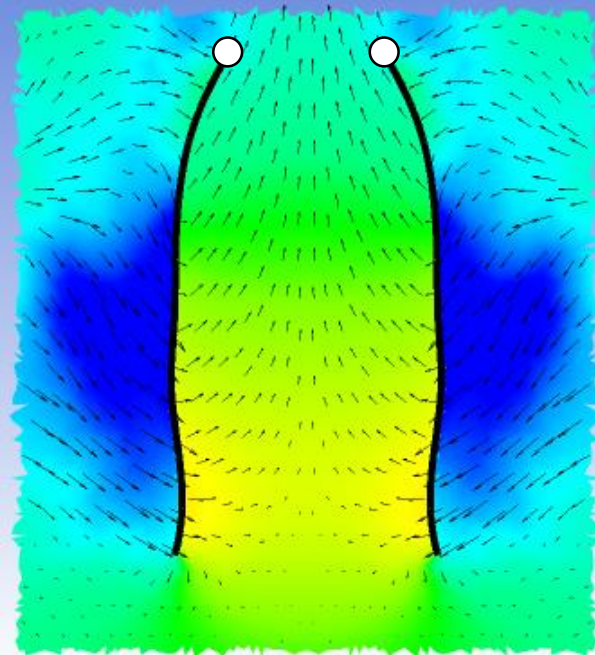


$t/T=0.23$

ANSYS
R16.2
Acoustic

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

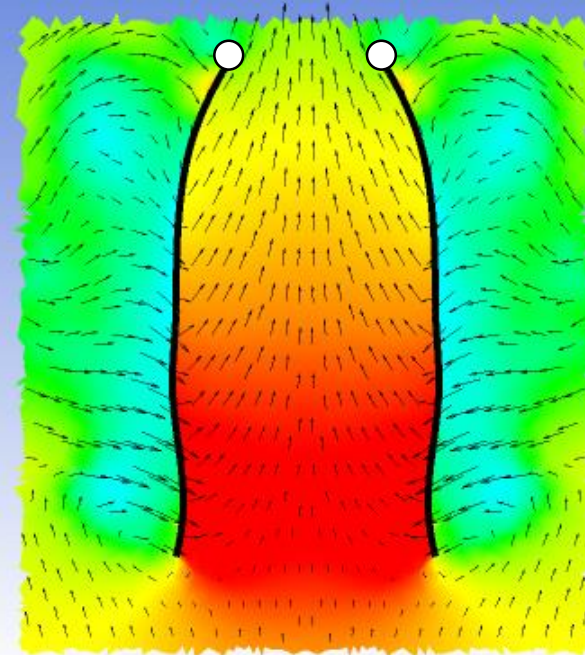
$J=0.5$



ANSYS
R16.2
Acoustic

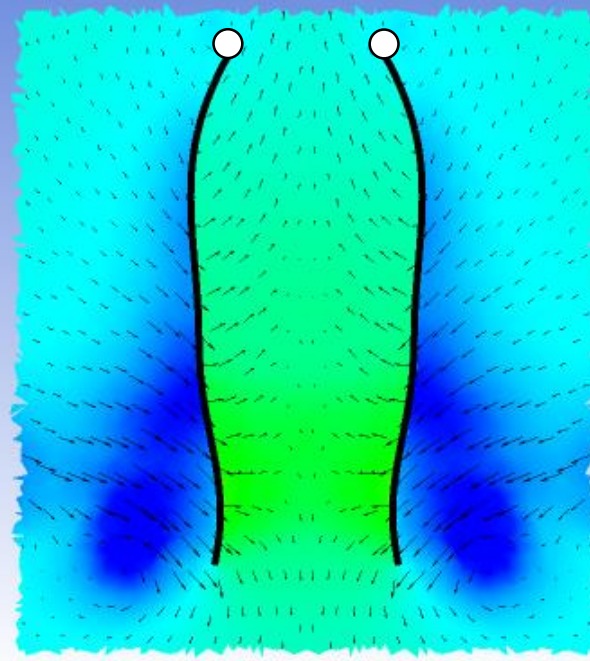
Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=1$



Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

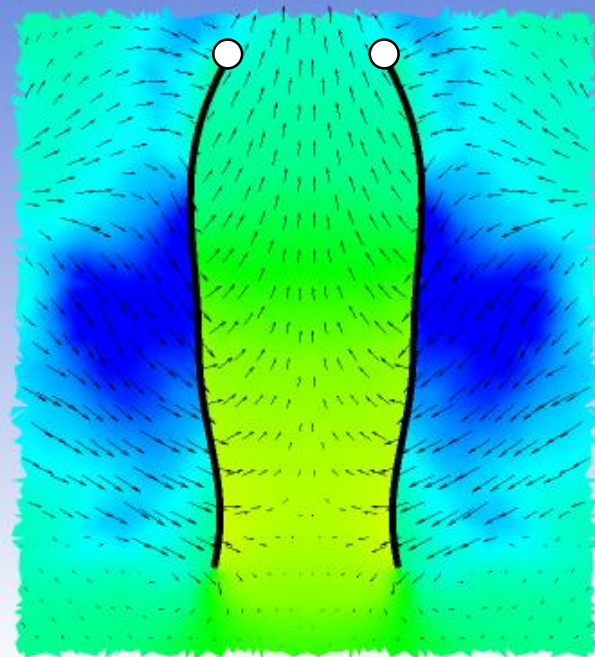
$J=0$



$t/T=0.24$

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

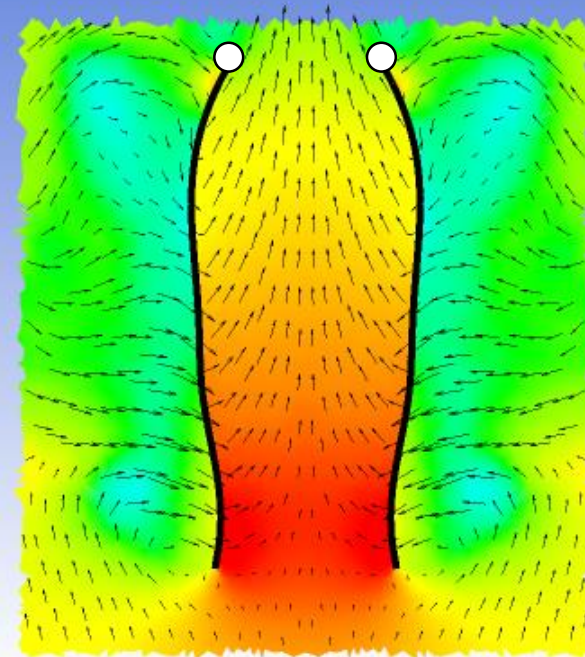
$J=0.5$



ANSYS
R16.2
Azimuthal

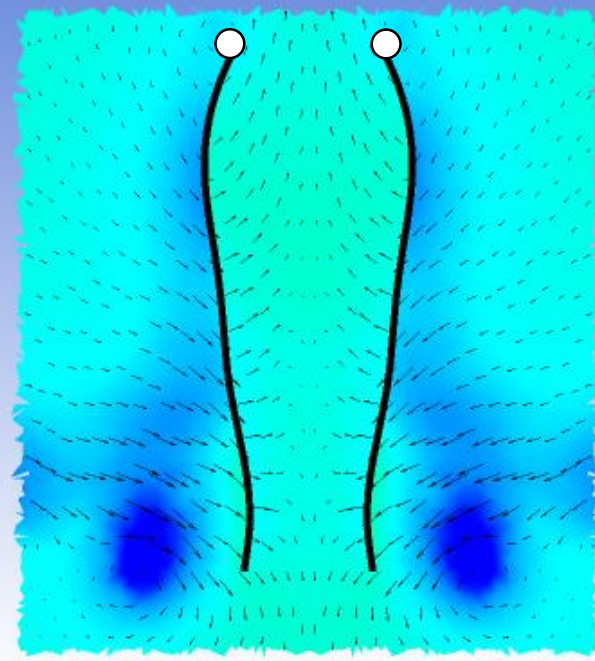
Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=1$



Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

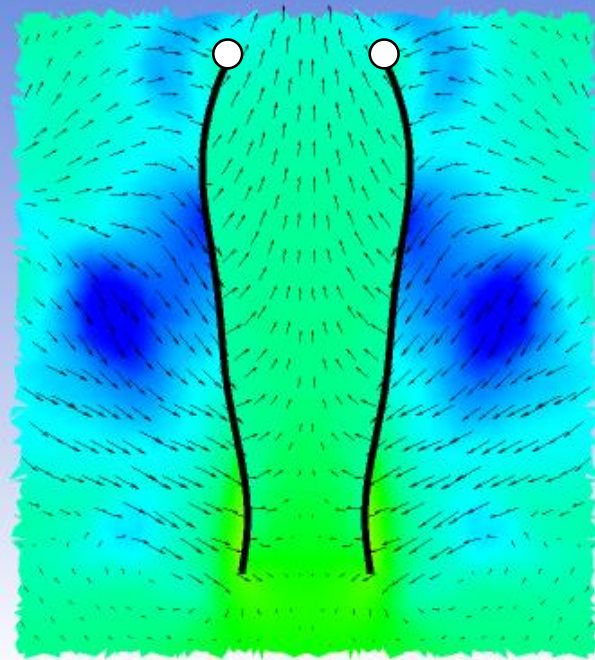
$J=0$



$t/T=0.25$

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

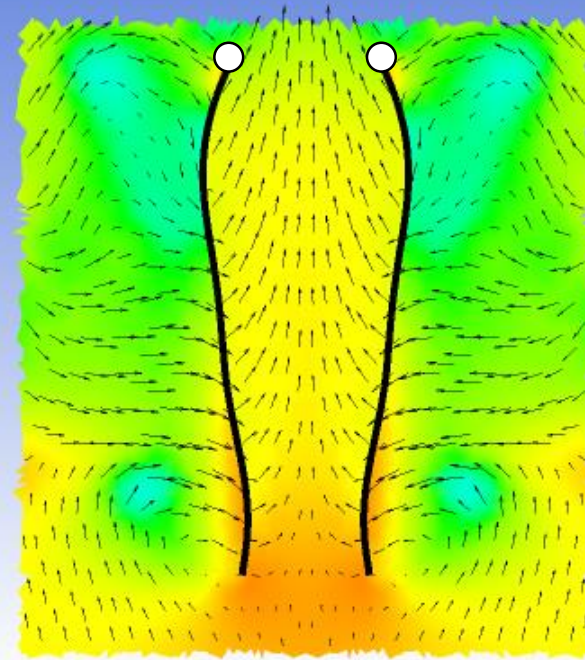
$J=0.5$



ANSYS
R16.2
Azimuthal

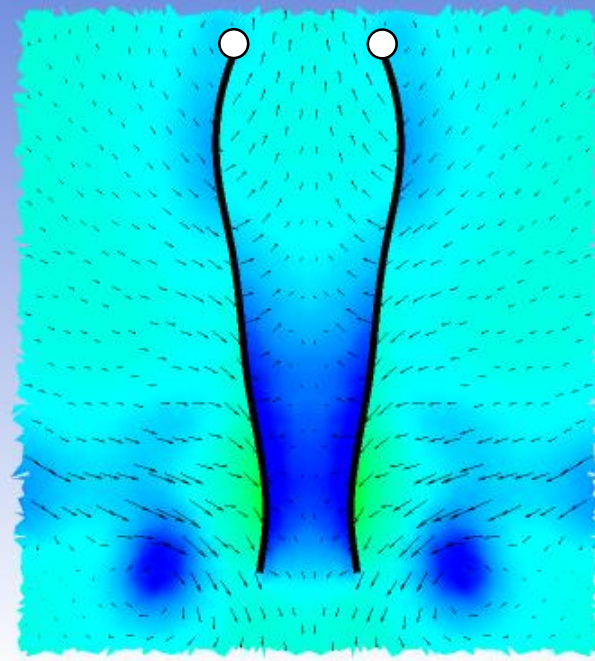
Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=1$



Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=0$

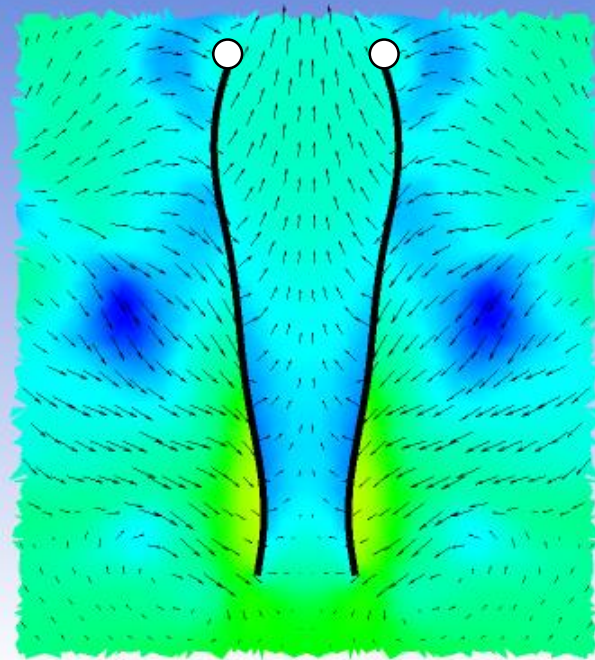


$t/T=0.26$

ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

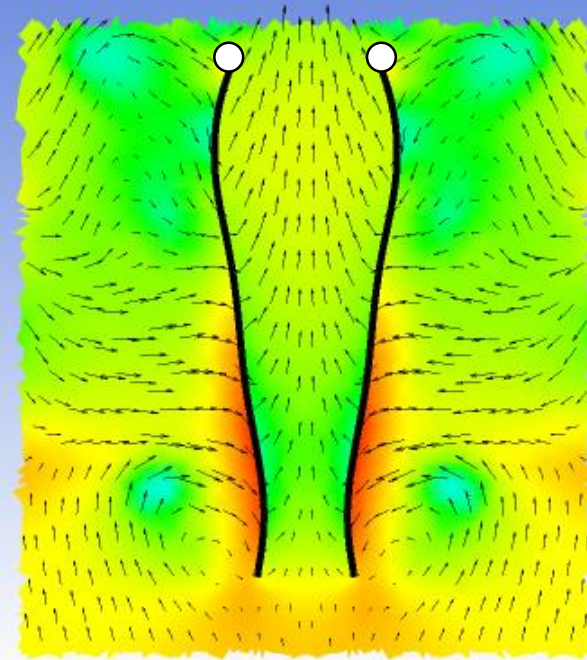
$J=0.5$



ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

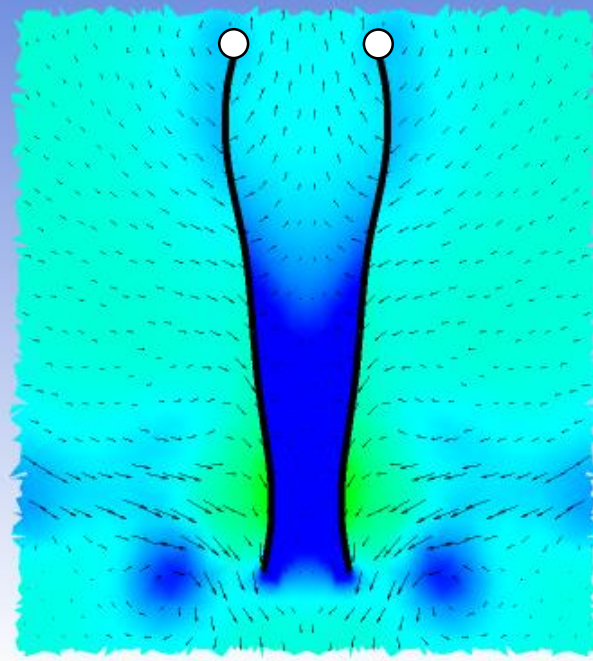
$J=1$



ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

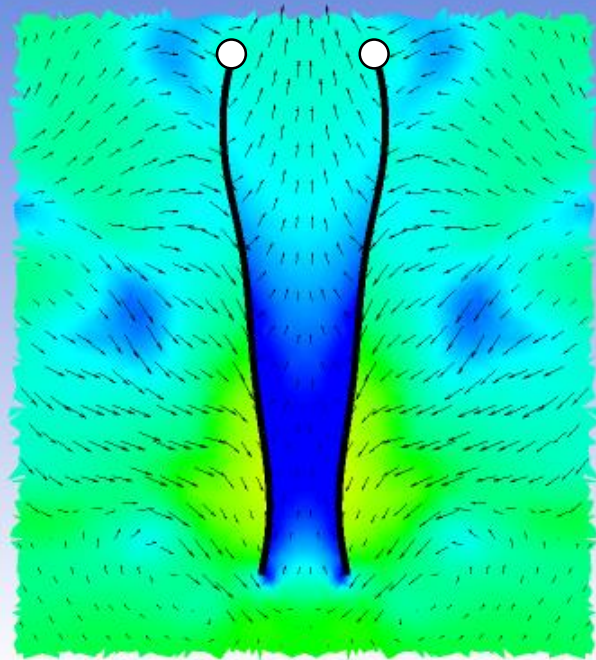
$J=0$



$t/T=0.27$

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

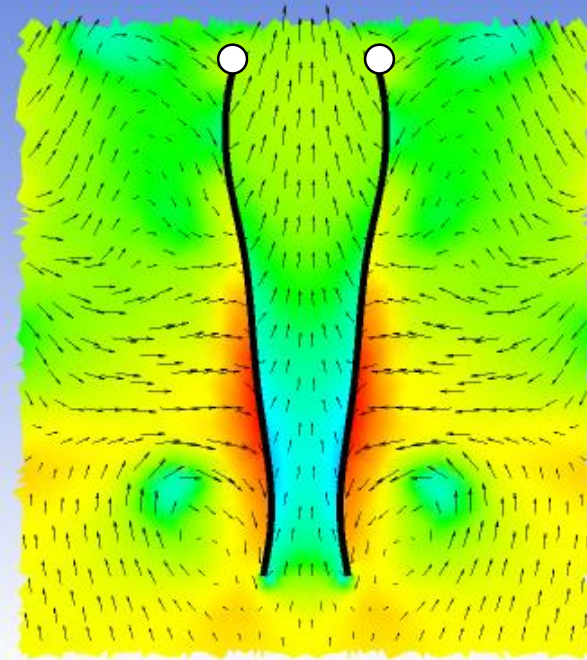
$J=0.5$



ANSYS
R16.2
Azimuthal

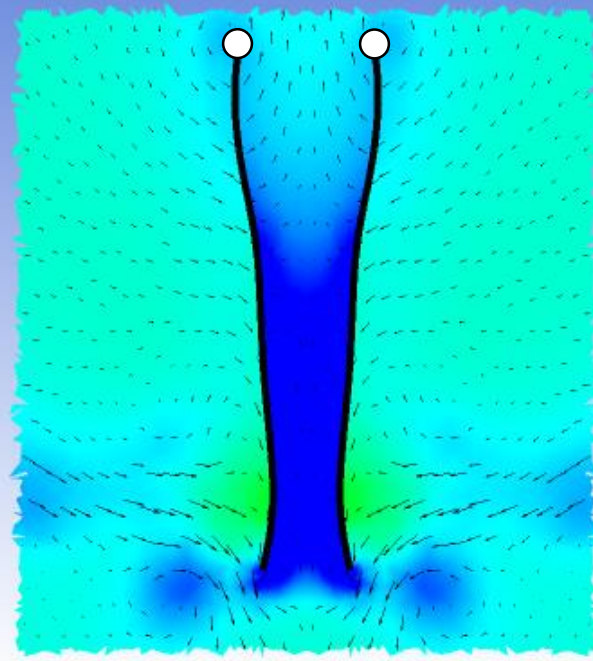
Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=1$



Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=0$

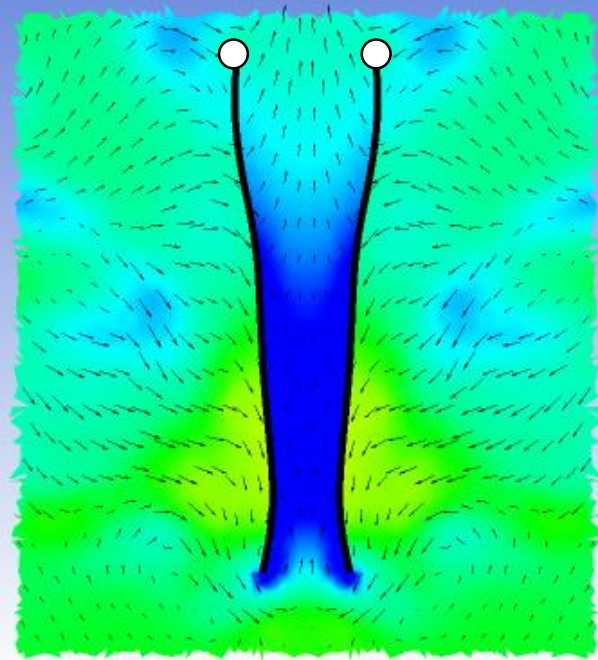


$t/T=0.28$

ANSYS
Fluent
Axisymmetric

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

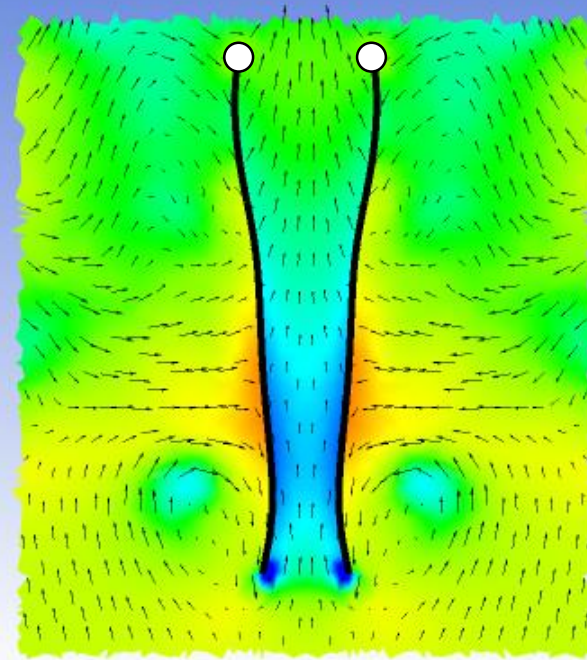
$J=0.5$



ANSYS
Fluent
Axisymmetric

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

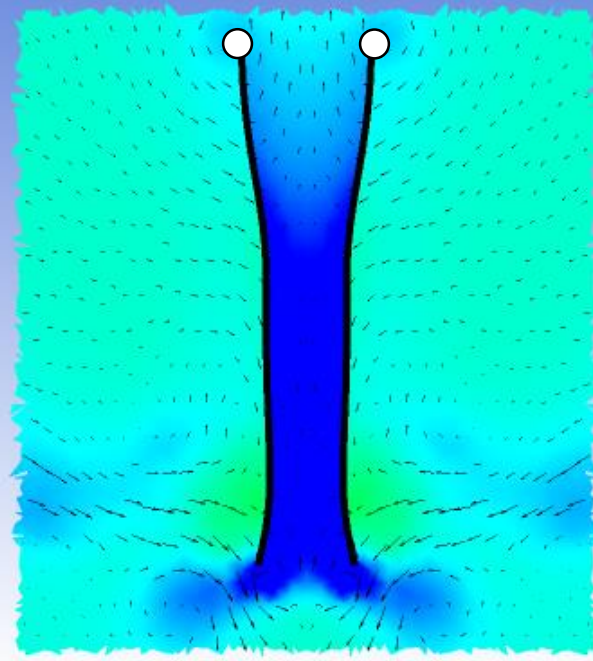
$J=1$



ANSYS
Fluent
Axisymmetric

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=0$

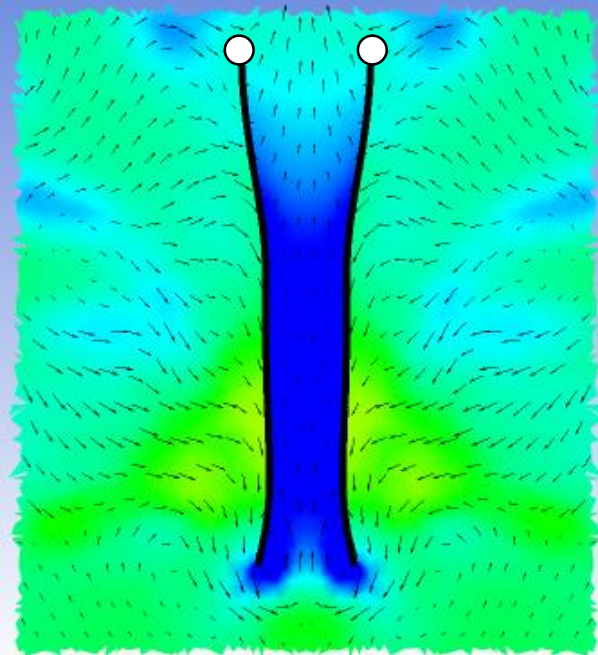


$t/T=0.29$

ANSYS
Fluent
Acoustic

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

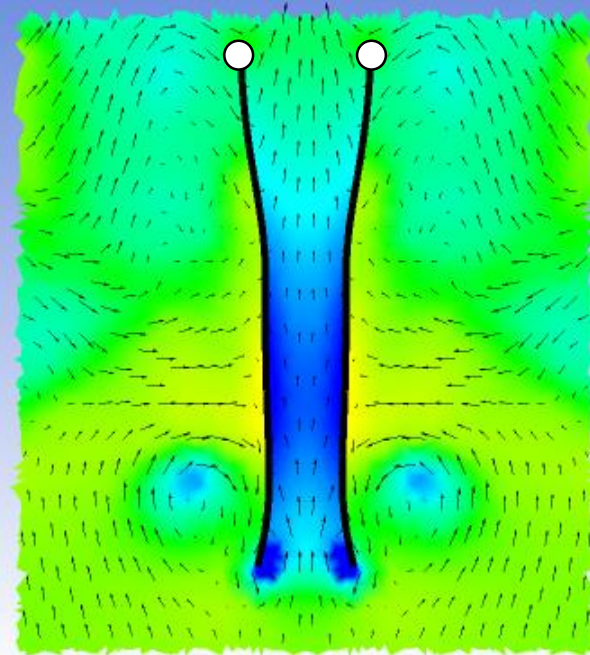
$J=0.5$



ANSYS
Fluent
Acoustic

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

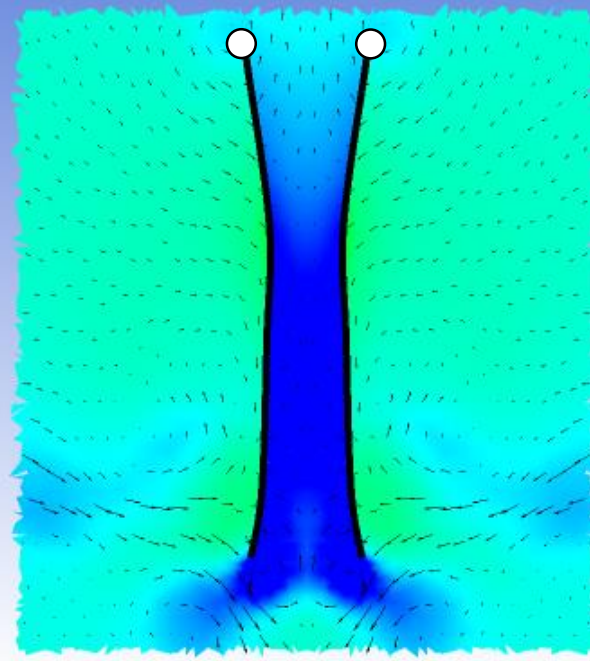
$J=1$



ANSYS
Fluent
Acoustic

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=0$

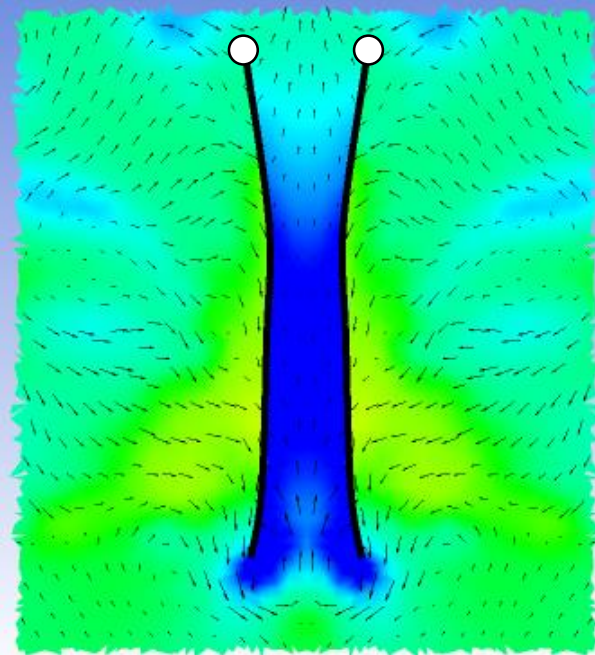


$t/T=0.30$

ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=0.5$



ANSYS
R16.2
Azimuthal

Pressure
Plane 1
100
72
44
16
-12
-40
[Pa]

$J=1$

