Exercise

Running Ateles-Harvesting for test case: flow around square geometry

Workflow

- Connect to cluster
  `ssh training`
- Reminder: your workspace should be accessible via `$MYWS`, you can check on it with `ws_list`
- Go into your hpcfdx4 directory (we created it yesterday)
  `cd $MYWS/hpcfdx4`

- Use the batch script to proceed with the visualization
  `visualize.job`

Workflow (details on what visualize.job does)

- Change into the simulation directory, for example:
  `cd n40_m0.3_a45/`
- Check the restart directory (should contain several *.lsb and *.lua files)
  `ls -l restart`
- Copy config file into current folder
  `cp ../harvest_series.template ../series.config .`
- harvest_series.py requires python > 2.7
- Run Ateles-Harvesting to generate vtk files (may take minutes)
  `python3 $KURS/bin/harvest_series.py -c series.config`
- Repeat the above steps for other simulations
- When waiting, you can first open paraview,
  Next slide will show that procedure.

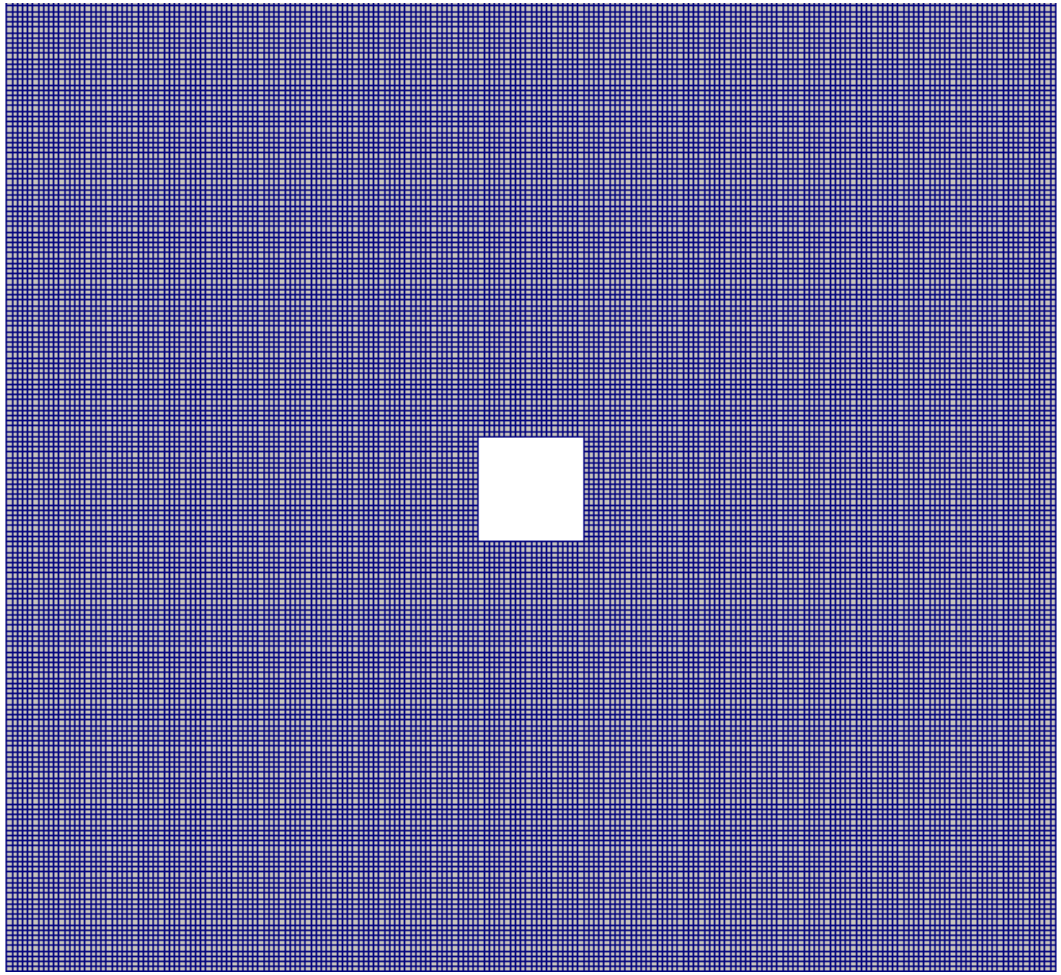
Run paraview @HLRS

- Harvest_series scripts writes output into the directory **vis**
- Open a new terminal
  `<Ctrl>+<Shift>+t`
- Copy your data on your local machine to open them in paraview
- Start paraview on your local machine
  `paraview &`

WHAT RESULTS YOU SHOULD YOU GET?

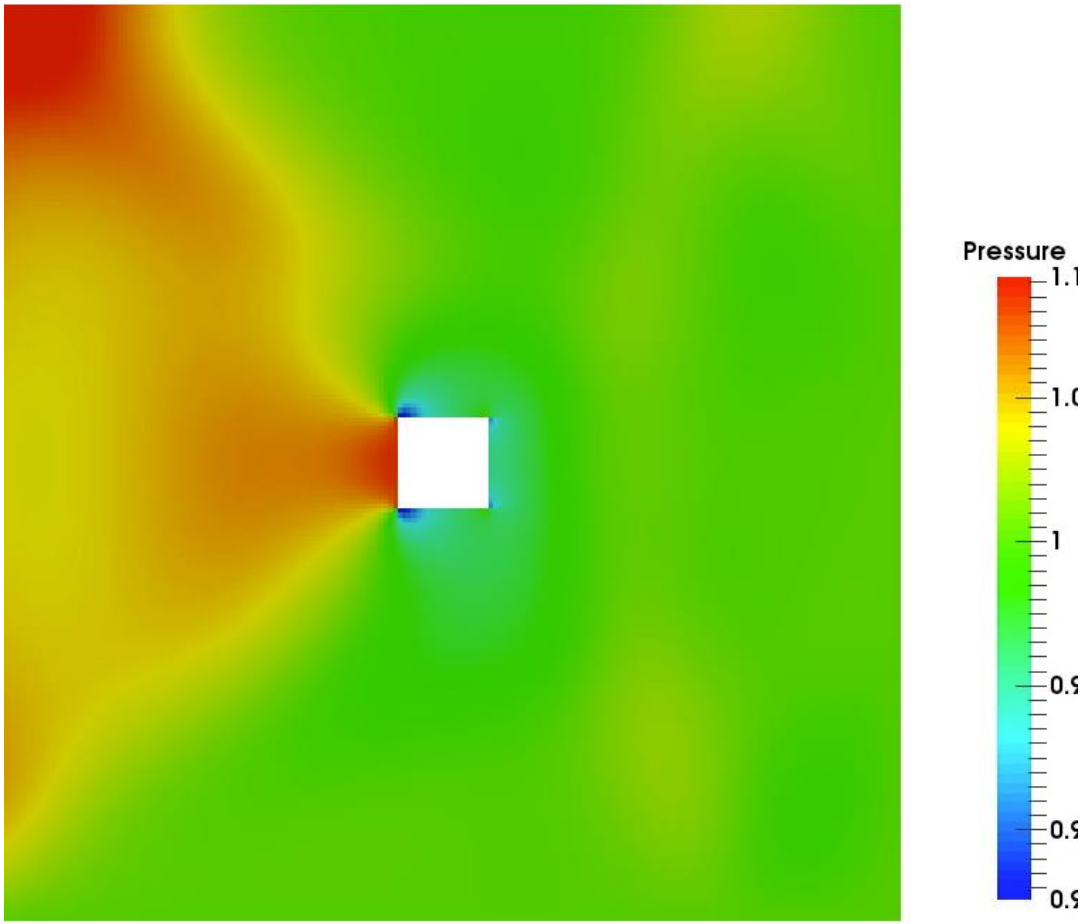
Example

- Flow around a square obstacle
- Mach Numbers;
  Ma = 0.3, 0.8 1.0, 1.3, 3.0
- Angles of attack: 0°, 30°, 45°



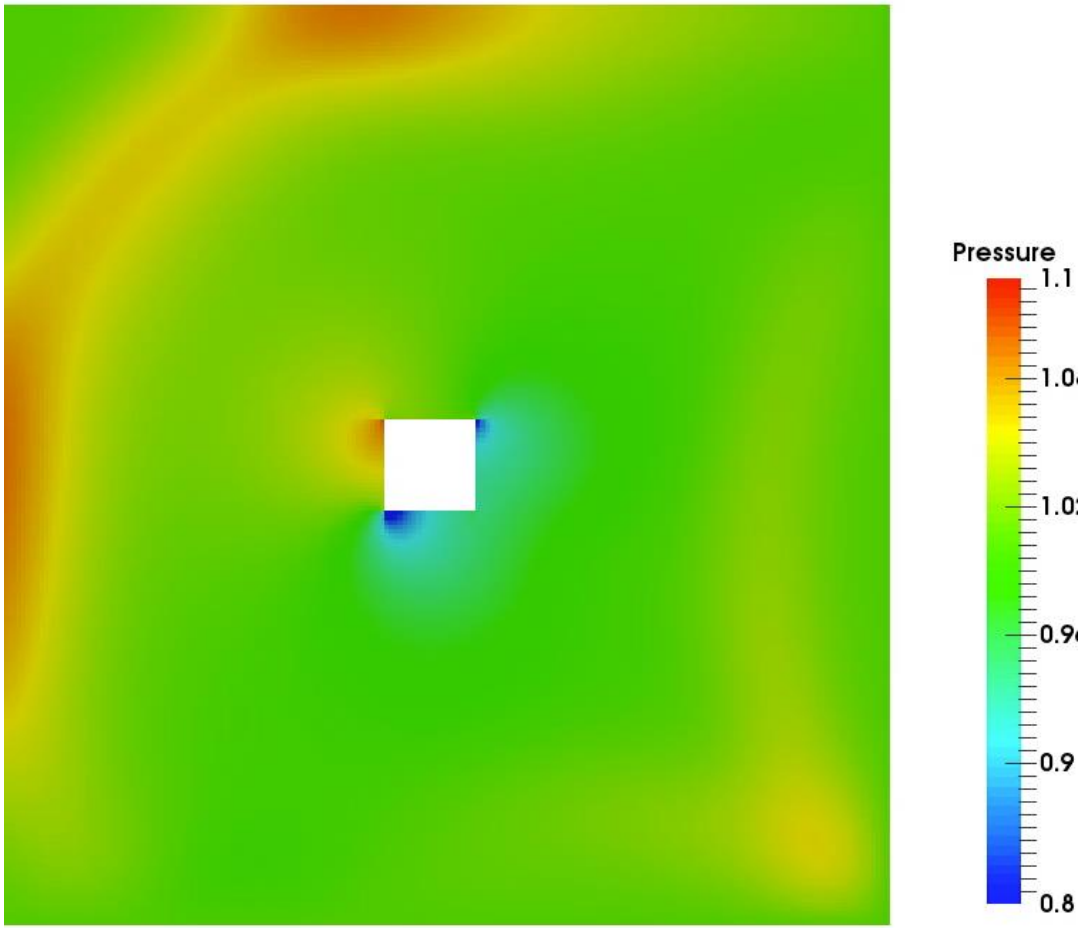
Ma 0.3@ 0°

- Pressure profile at considerably low Mach number
- High pressure zones evenly spread out



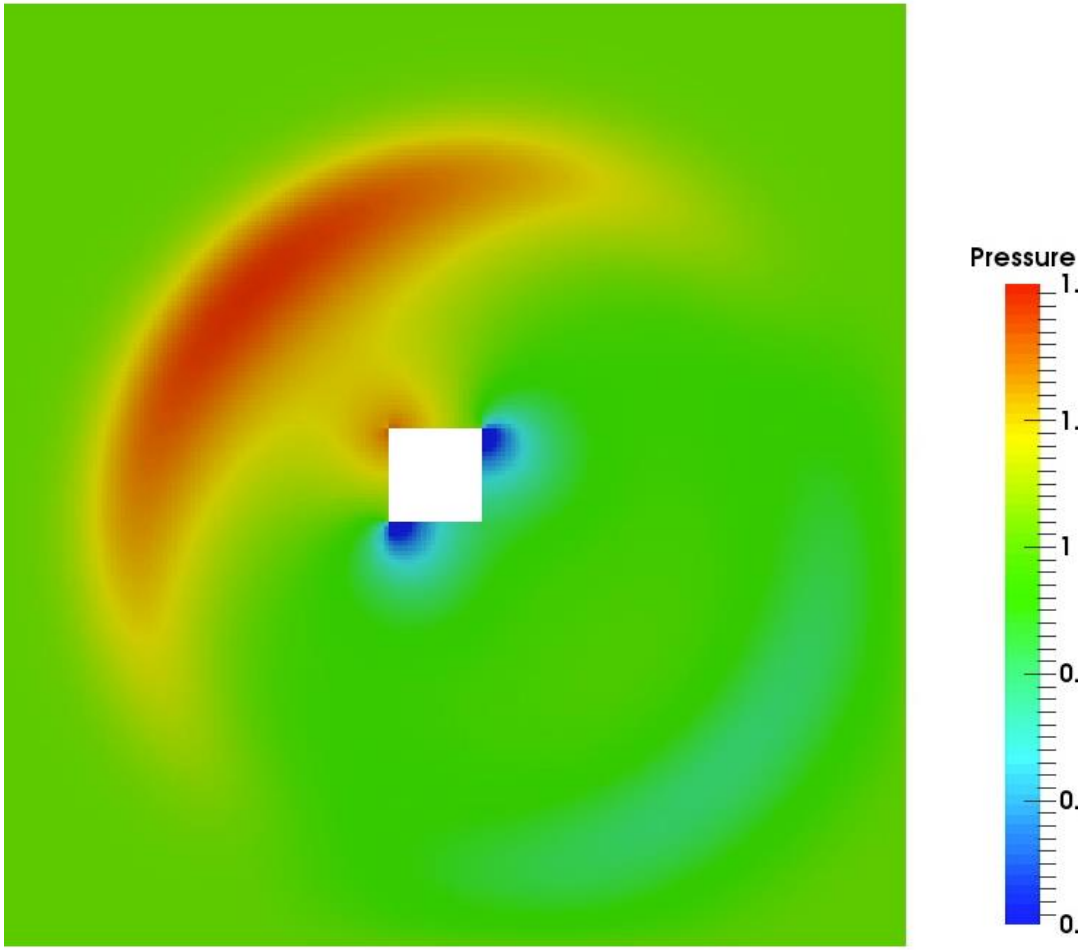
Ma 0.3@ -30°

- Pressure profile at considerably low Mach number
- A shift in the high pressure zones



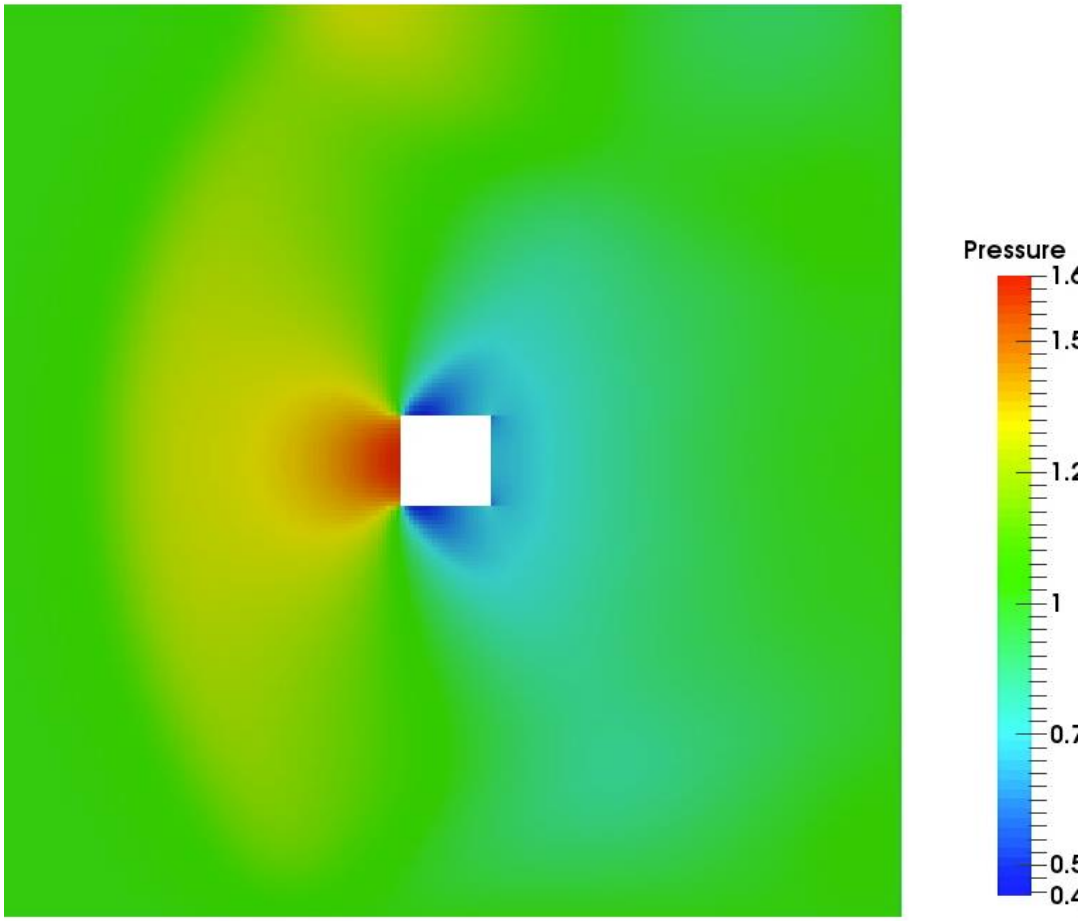
Ma 0.3@ -45°

- Pressure profile at considerably low Mach number
- A shift in the high pressure zones



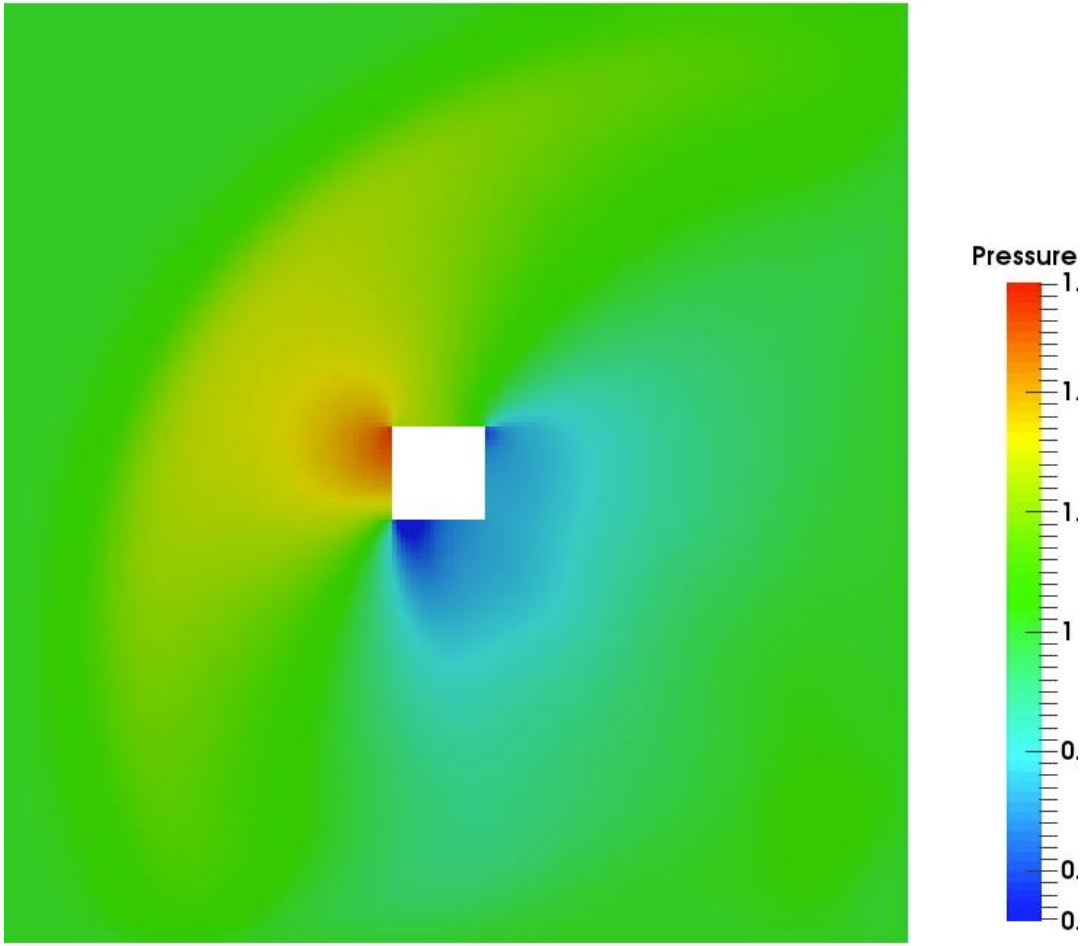
Ma 0.8@ 0°

- Emergence of pressure wave with an increased Mach number
- Concentrated low pressure zones near obstacle



Ma 0.8@ -30°

- Emergence of pressure wave with an increased Mach number
- Rotated pressure profile



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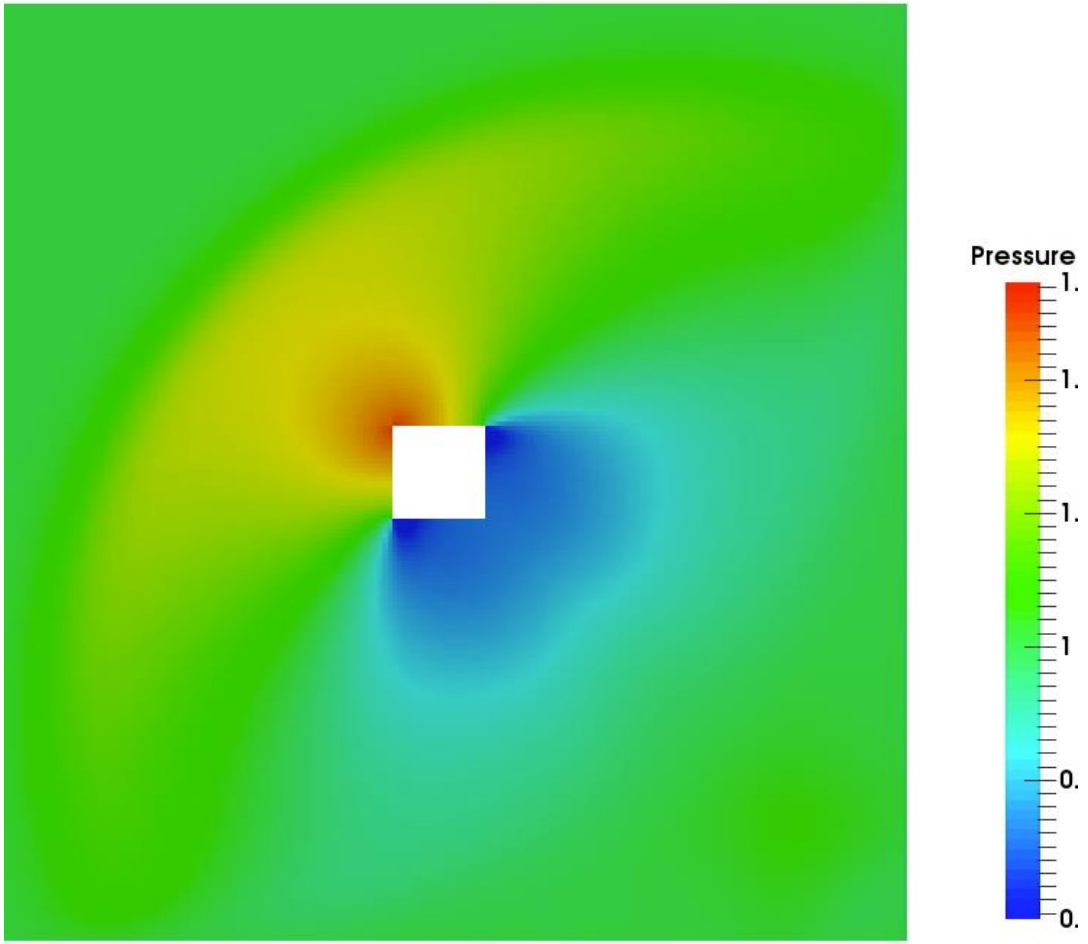
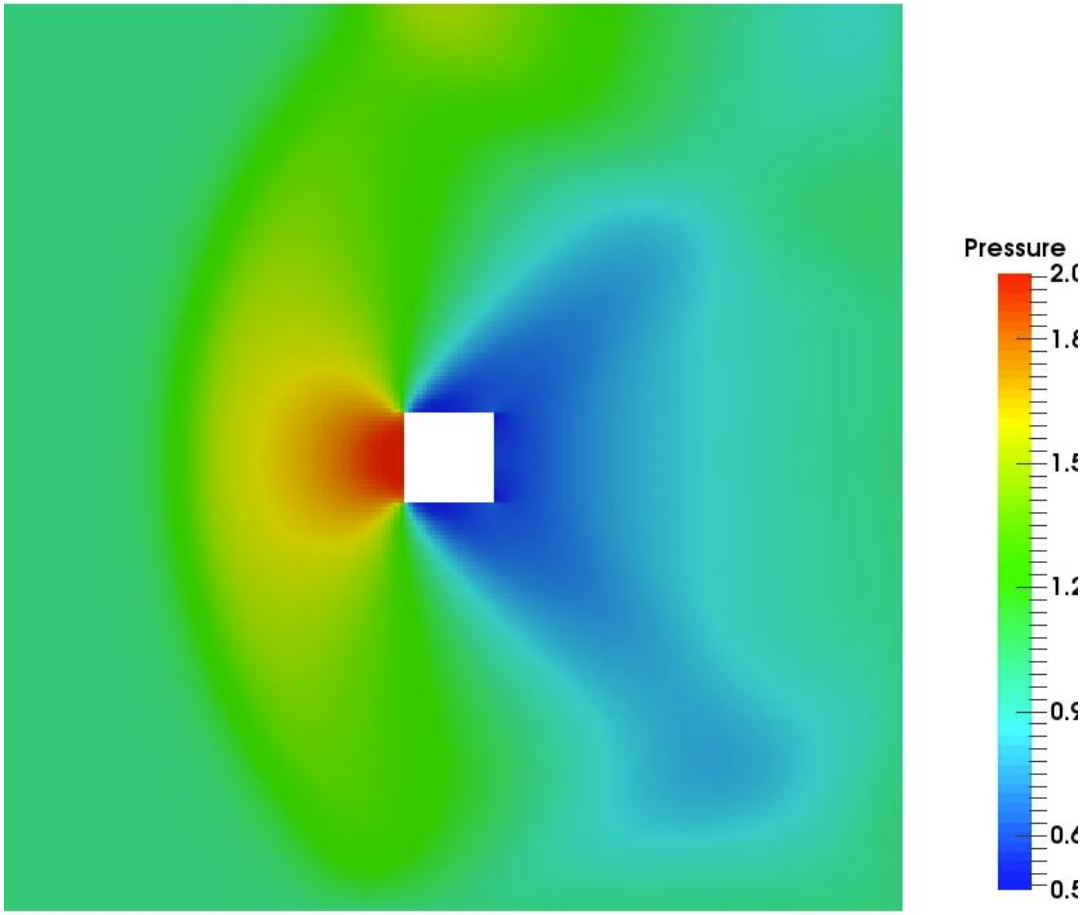
- Rotated pressure profile



Ma 1.0@ 0°

- The high and low pressure zones become focused
- The pressure wave reflects from the boundaries



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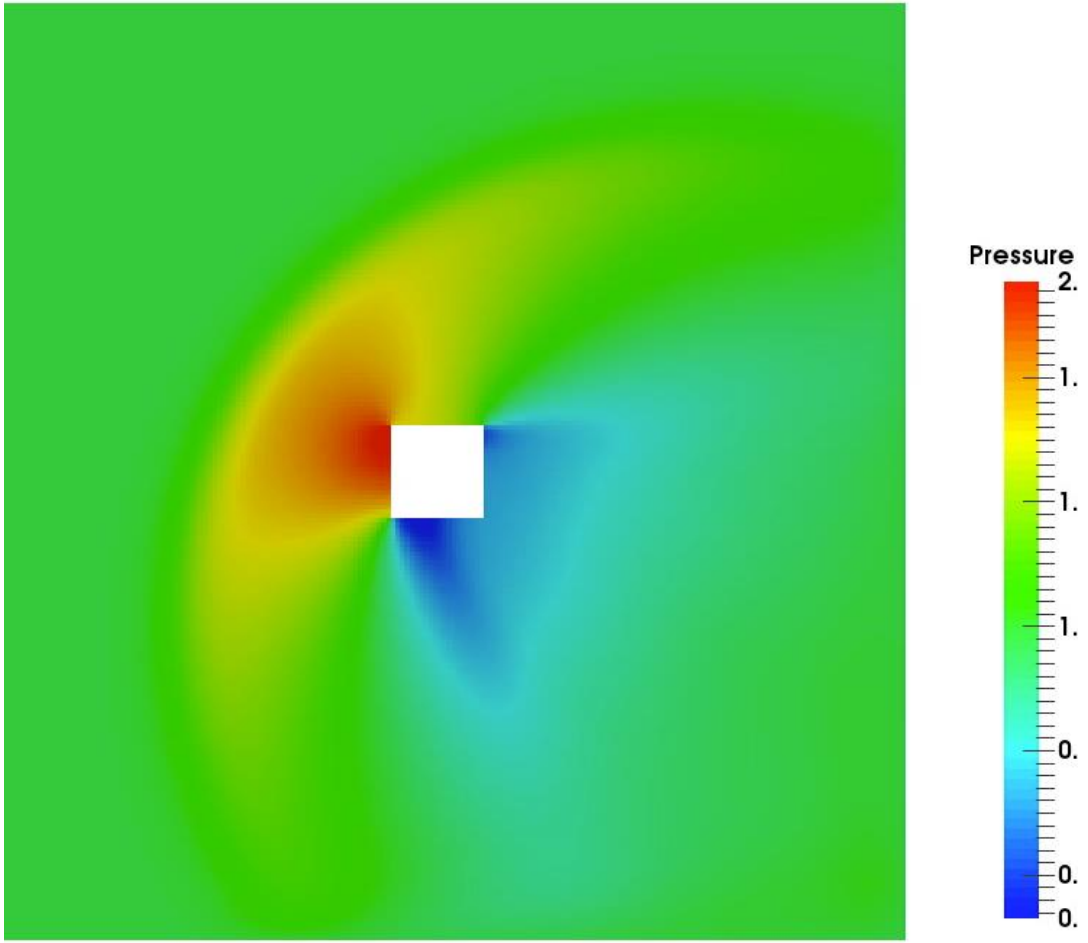

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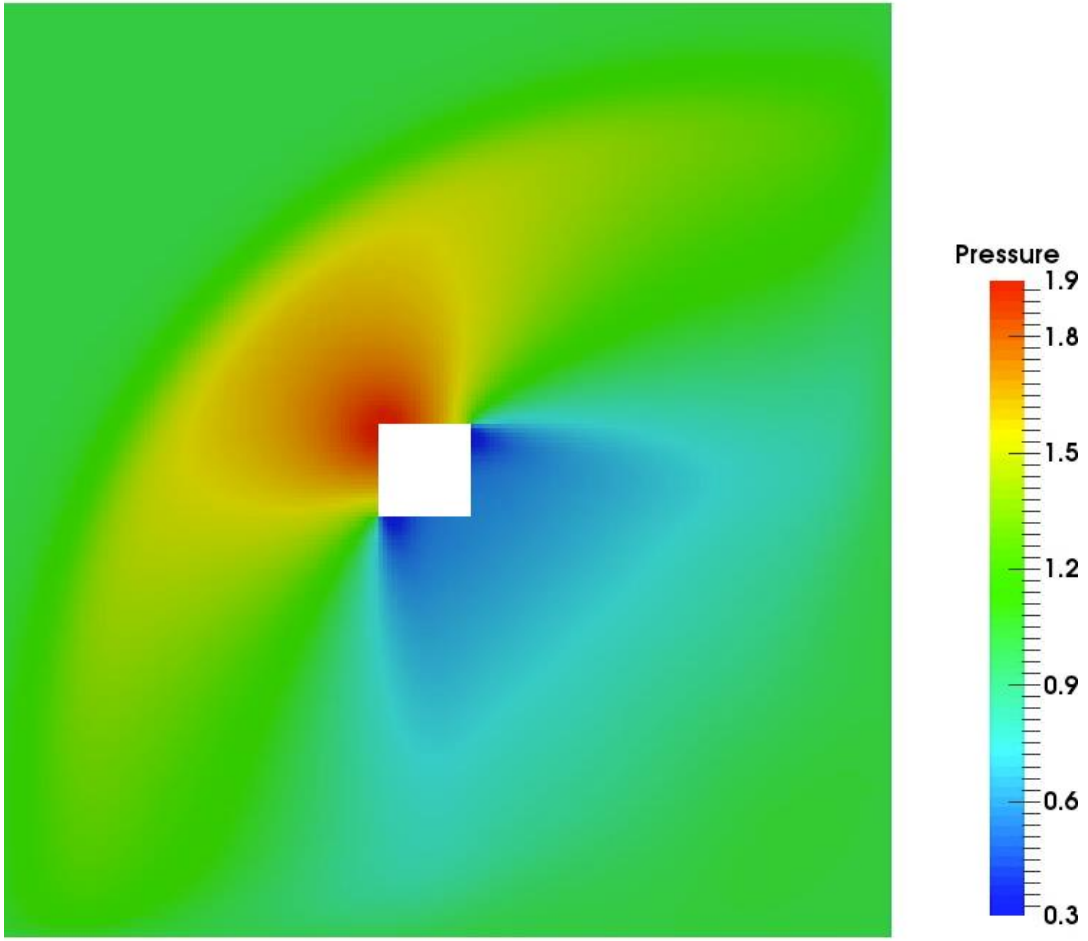
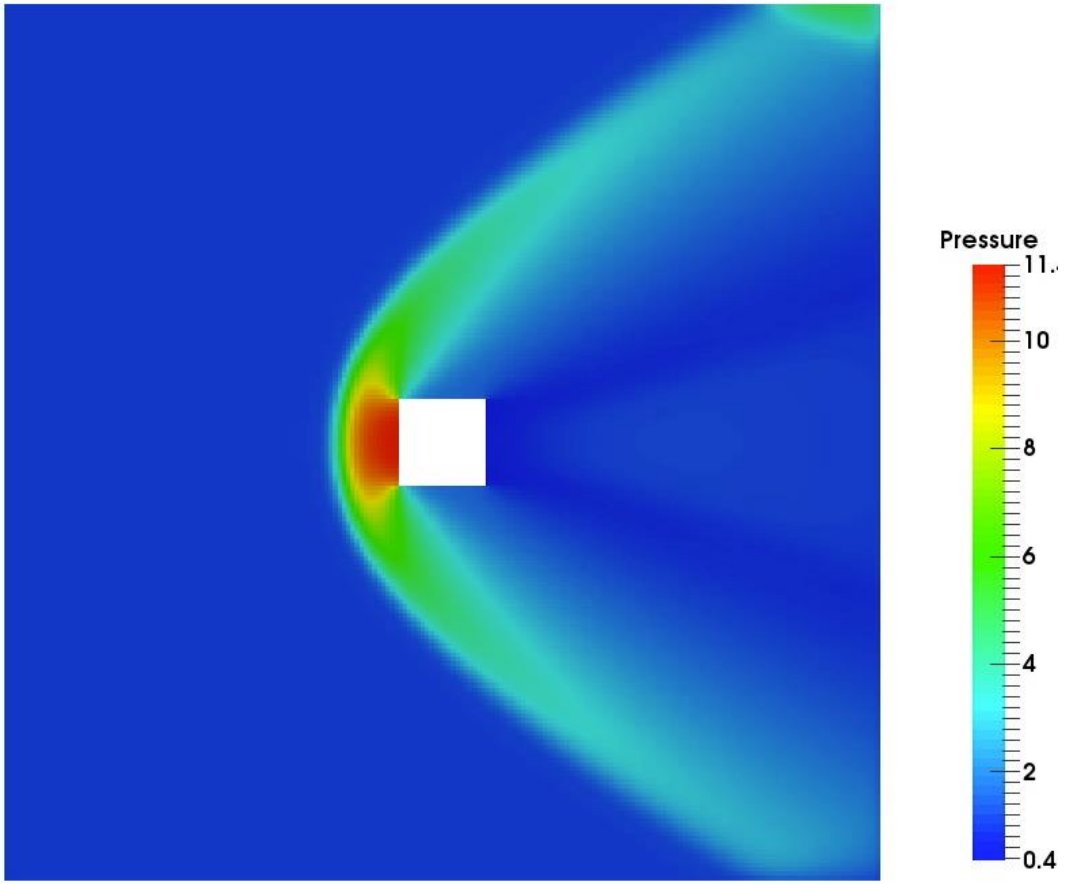


Ma 3.0@ 0°

- Very highly focused *beam*
- Intense reflection from boundaries
- Discontinuities develop as shocks around obstacle



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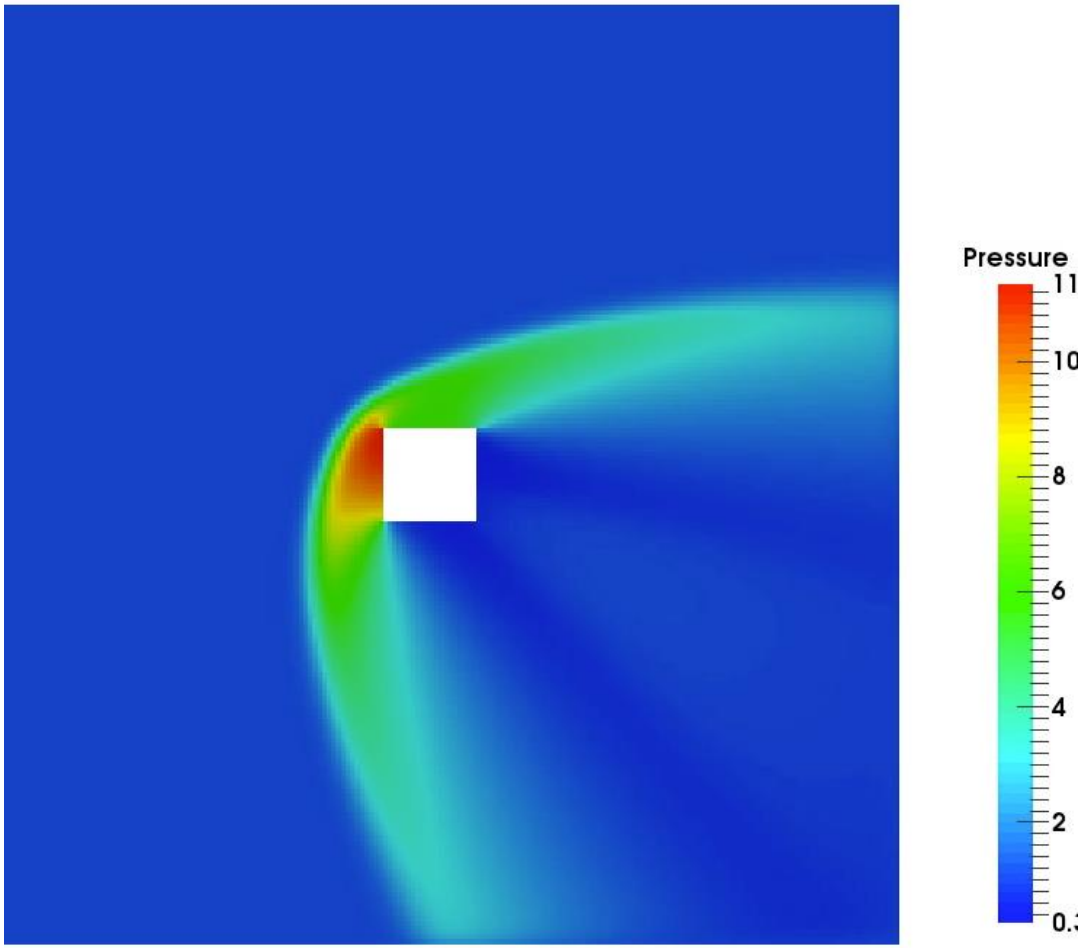

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