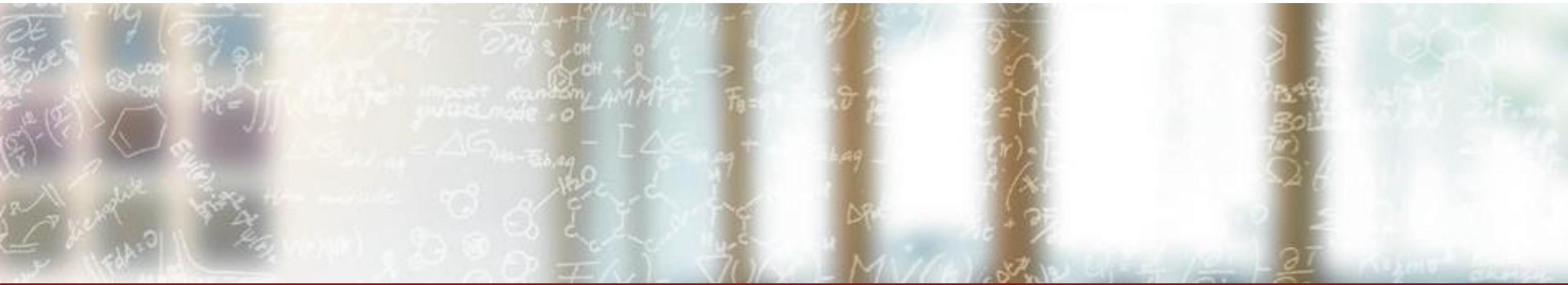




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# Scientific visualization

**PDC Summer School 2023**

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# Vector field visualization

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# Vector field visualization

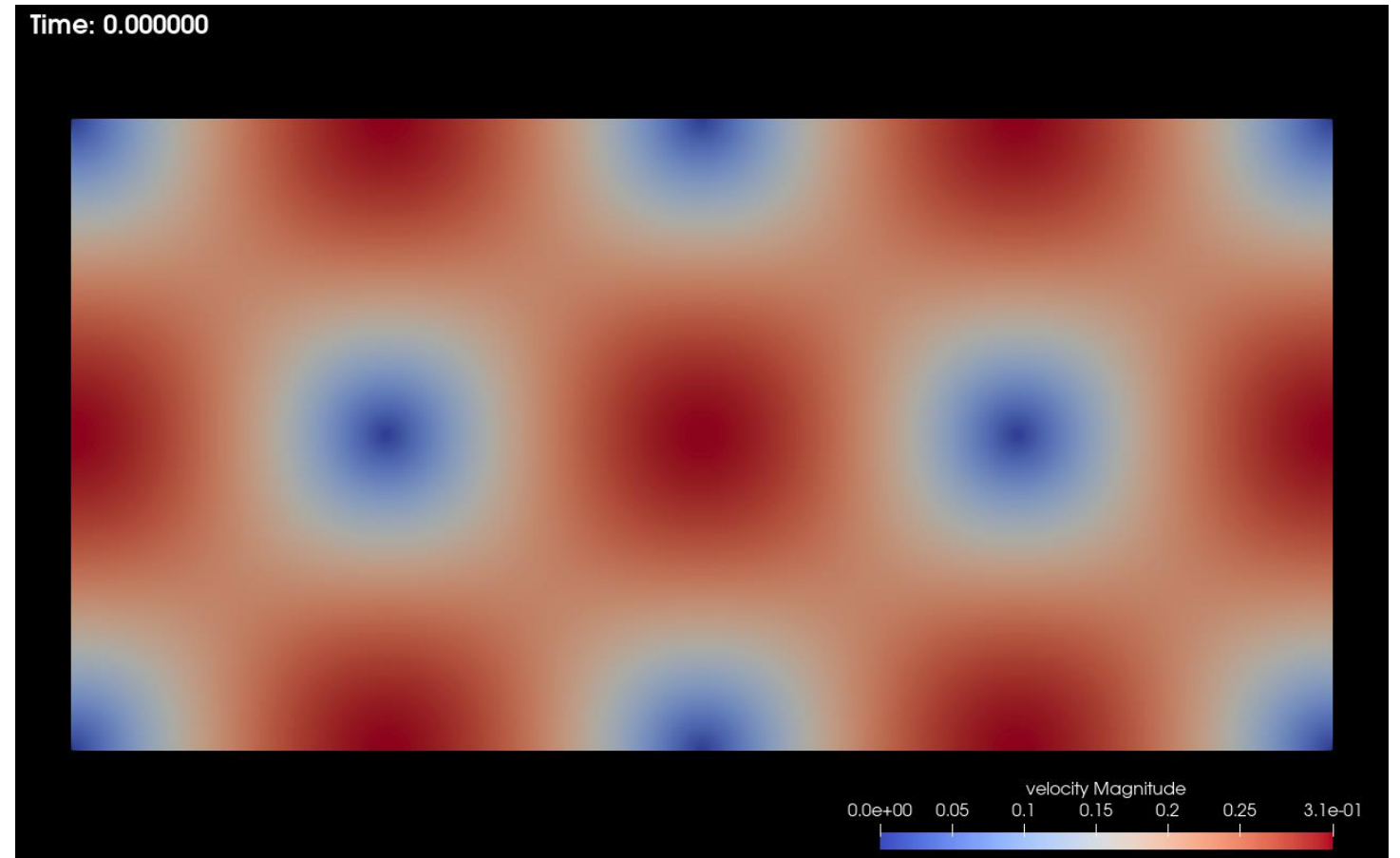
- Use a scalar field visualization technique
- Use glyphs representations (oriented arrows in the direction of the field)
- Use lines tangent to the vector field

Time-dependent data:

- Use particle traces
- Use pathlines

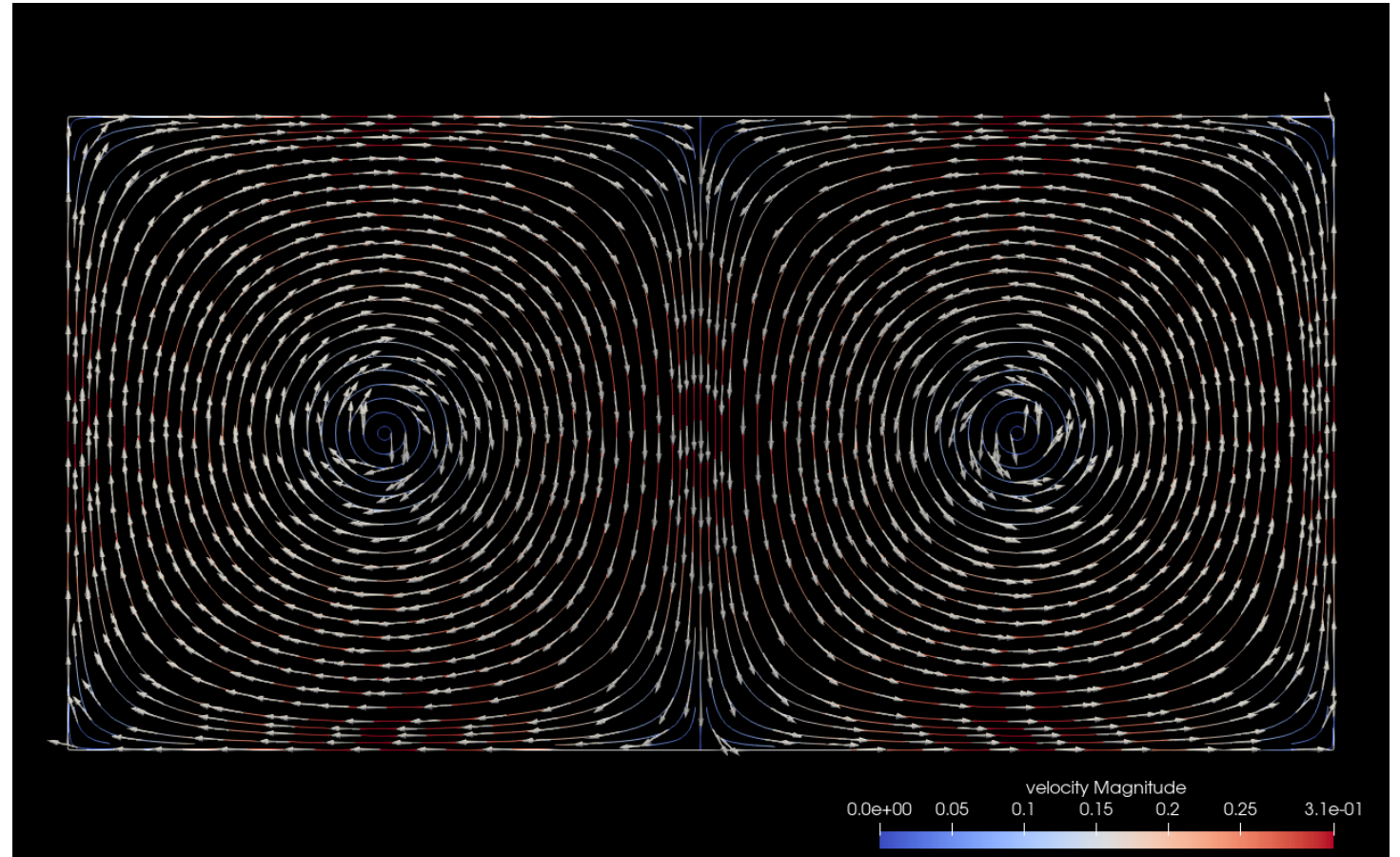
# Vector field visualization (1)

- Shade the vector field by its magnitude
- Missing cues?
  - direction



## Vector field visualization (2)

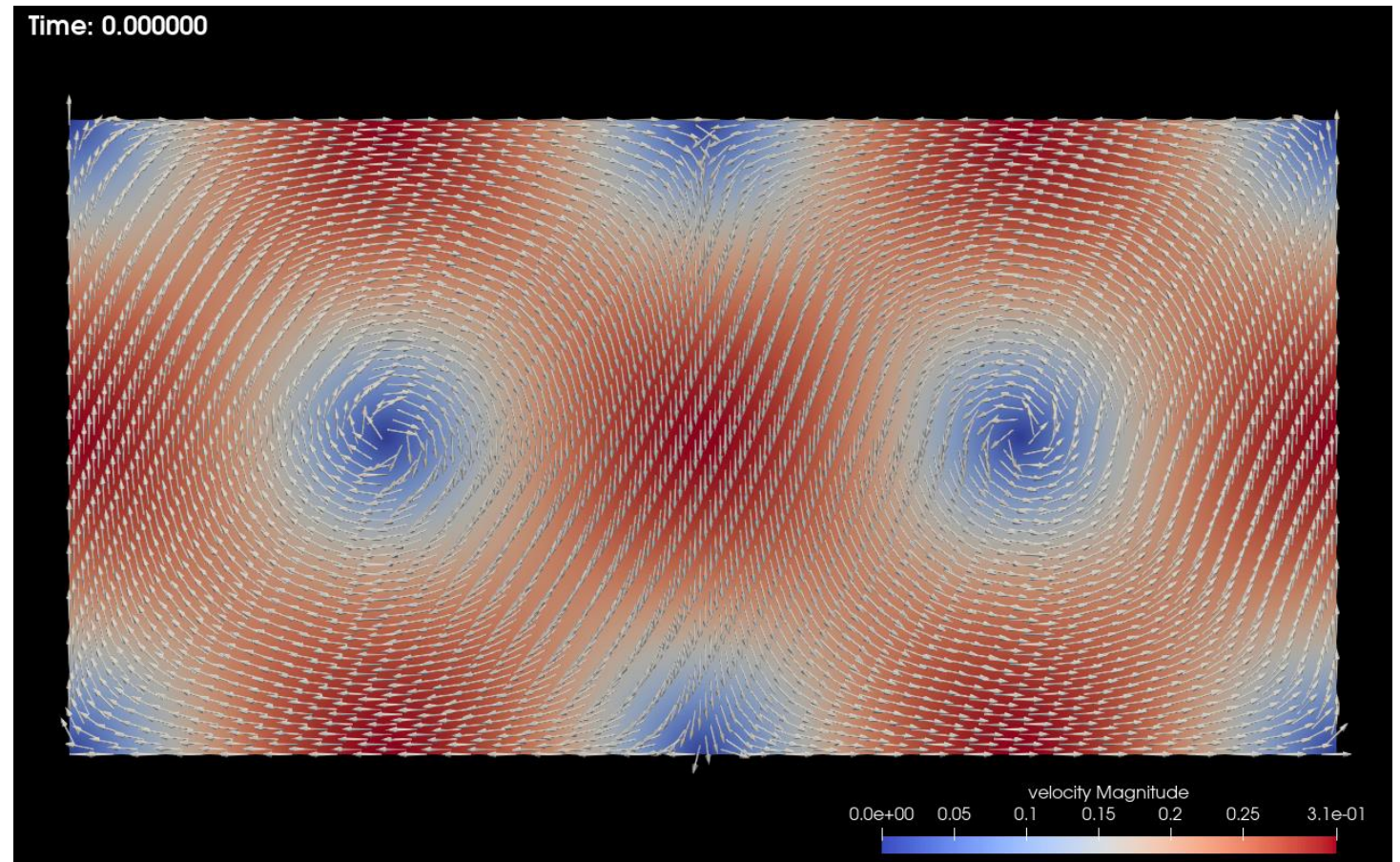
- Draw arrows oriented in the direction of the field
- Issues?
  - Make the density of arrows dependent on the zoom ration
- Difficulties?
  - Can be too complicated in 3D





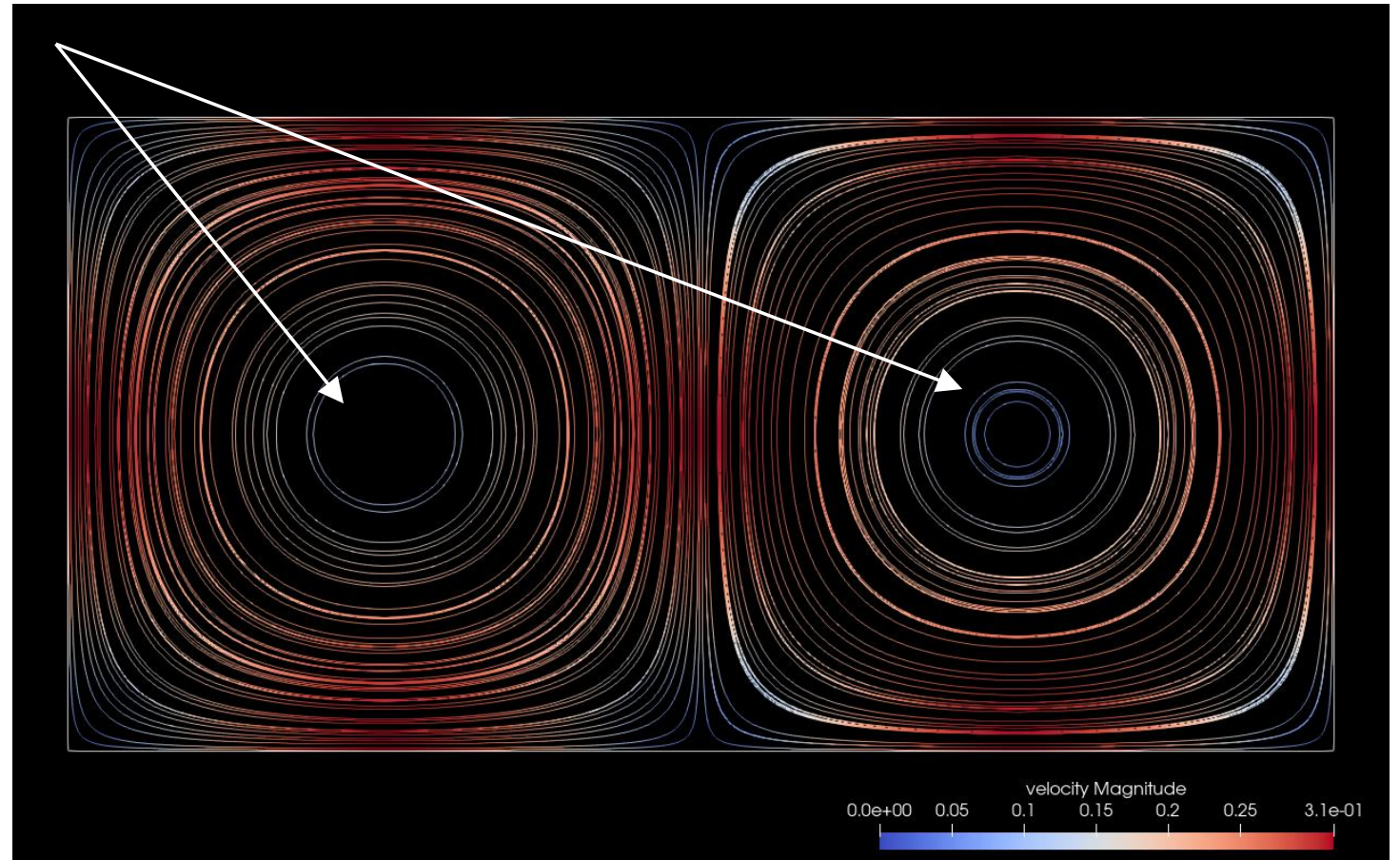
## Vector field visualization (2)

- Apply both techniques seen earlier



## Vector field visualization (2)

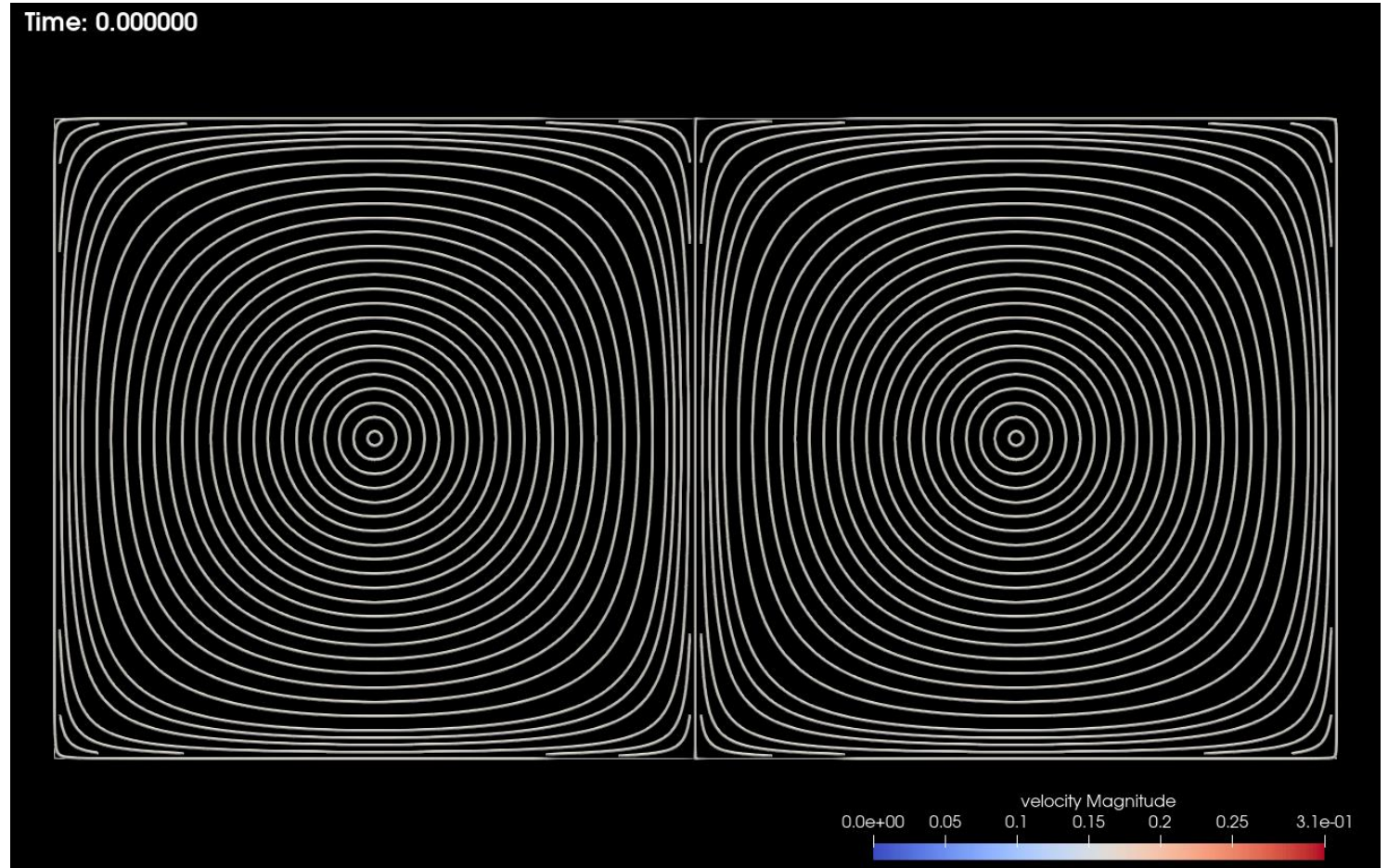
- Draw streamlines tangent to the vector field
- Difficulties?
  - too dense, or too sparse





## Vector field visualization (2)

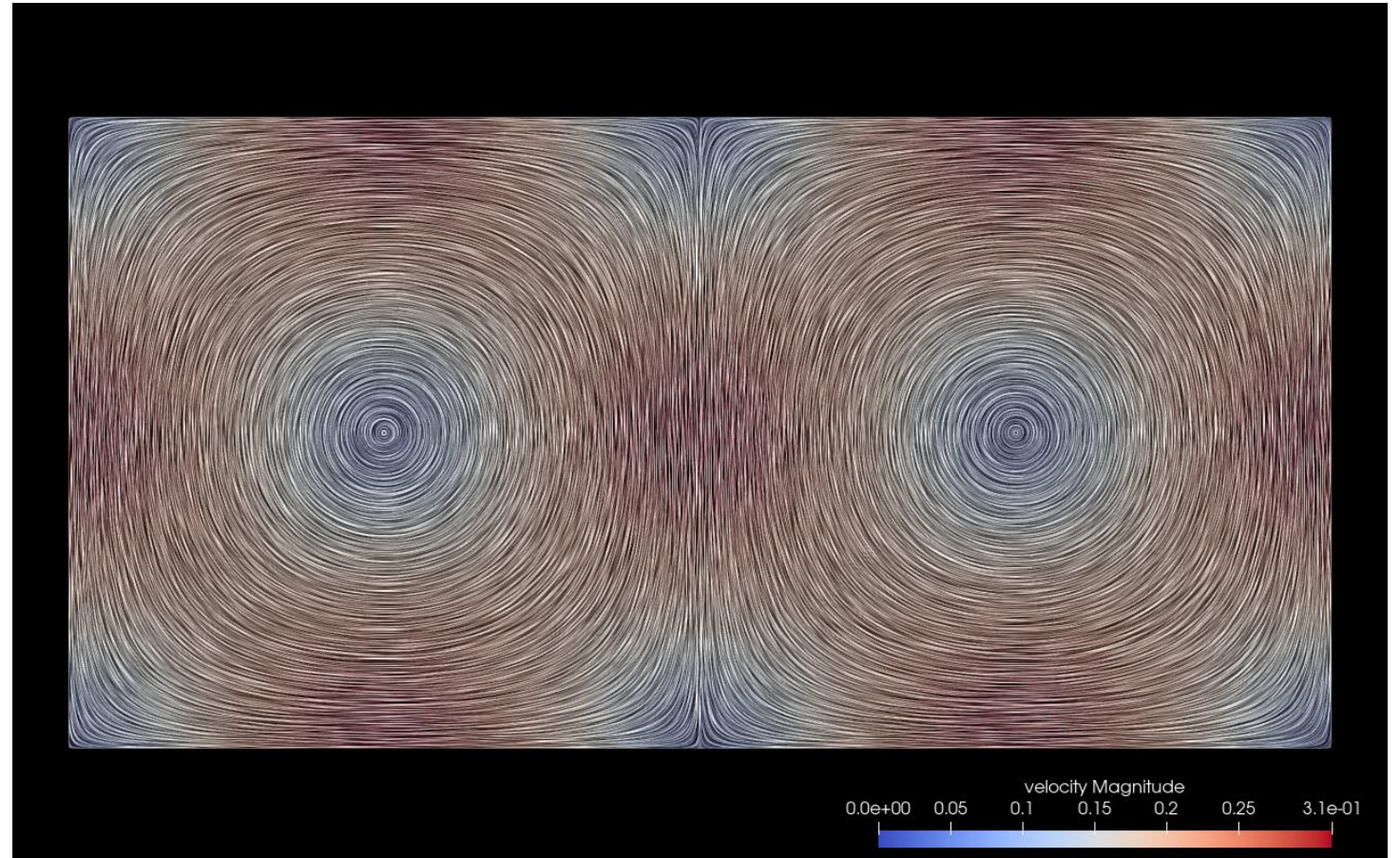
- Draw **evenly-spaced** streamlines tangent to the vector field
- Difficulties?
  - Missing in 3D





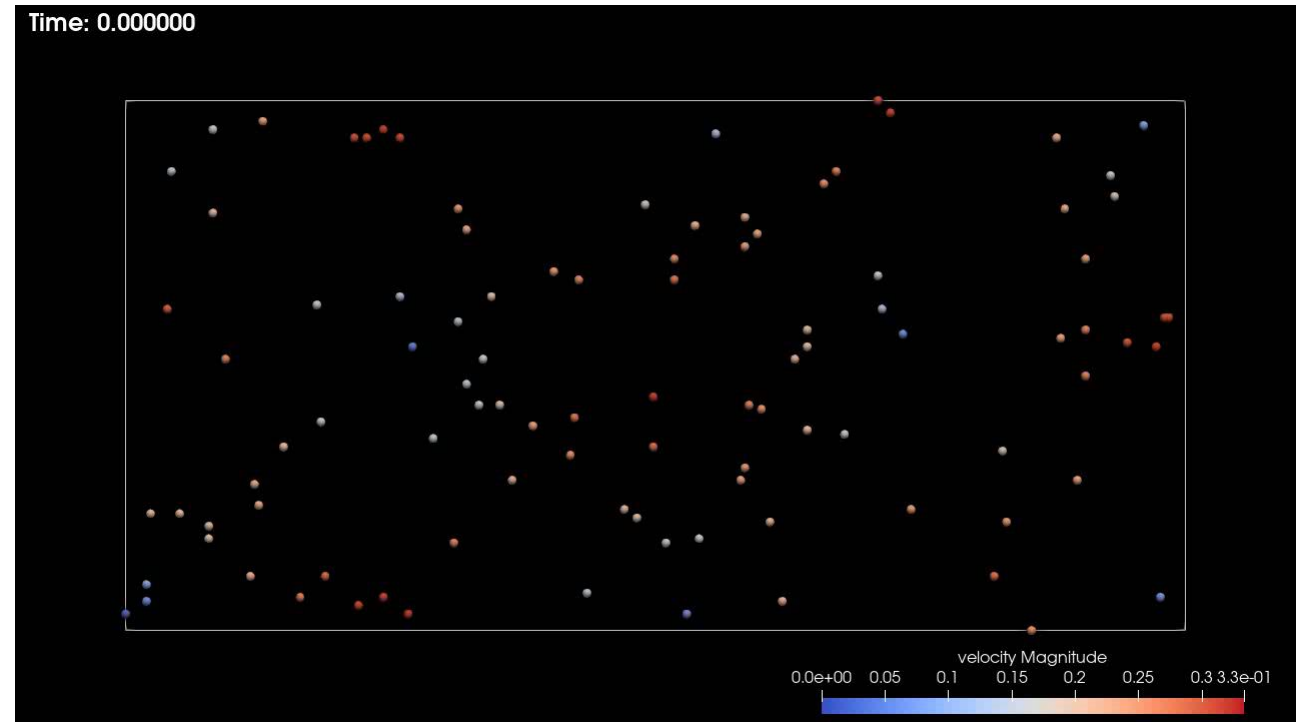
## Vector field visualization (2)

- Use a GPU-based representation to do a Linear Integral Convolution
- Difficulties?
  - Missing in 3D
  - Not correct for transient data



## Vector field visualization (2)

- Transient particles advected by the vector field
- Issues?
  - Particles disappearing
  - Can we re-inject particles at regular intervals?



## Vector field visualization (2)

- Transient particles advected by the vector field

