

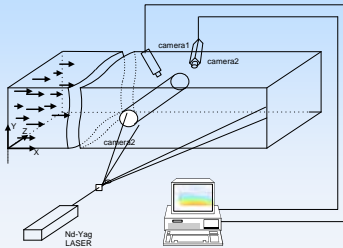
A VOLUME PTV

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Objectives

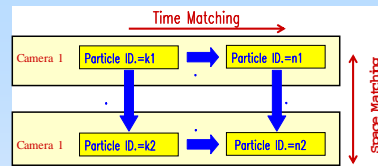
- Construct a volume measurement technique ($N > 10,000$ vectors)
- Application to the cylinder wake flows
- Investigate into the flow structures and their turbulence properties

Experimental Set-Up

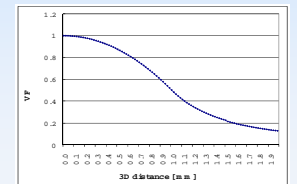
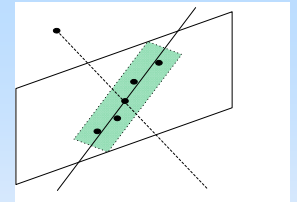
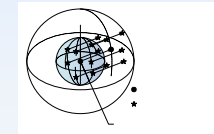
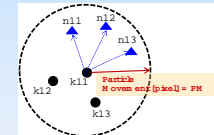


- Cylinder ($D=10\text{mm}$)
- 1k x 1k Camera
- Nd-Yag Laser
- LC880(synchronizer)

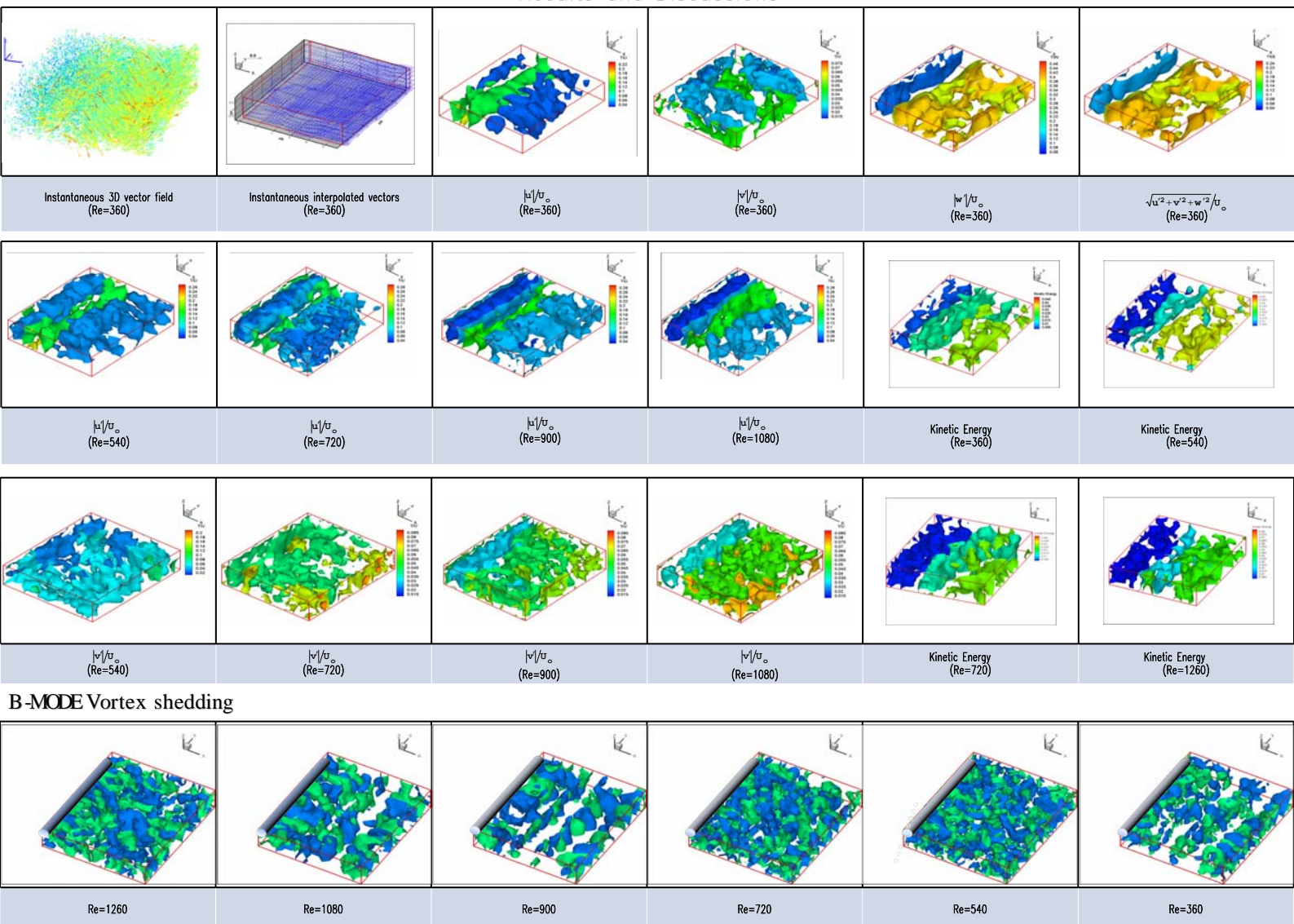
Volume PTV Algorithm



< Overall procedure for vector acquisitions >



Results and Discussions



Summaries

- Developed a new volume measurement technique ($N > 10,000$ vectors) using a hybrid fitness function and a coherency fitness function.
- Optimal parameters for the algorithm exists.
(PM [particle movements]= 8 pixels, PN [particle neighborhood] =5mm and VF [vector fitness] =0.3)
- For all Reynolds number cases, $|w| > |u| > |v|$ was satisfied, and each value was 2 times higher than others.
- w' distribution has a strong relation with that of the turbulent kinetic energy $\sqrt{u'^2+v'^2+w'^2}/U_0$, which implies that w' component largely influences the turbulent properties of the wake.
- Shapes of the B-mode structures were different each other for all Reynolds number conditions.