LaVision

We count on Photons

PIV Challenge 2001

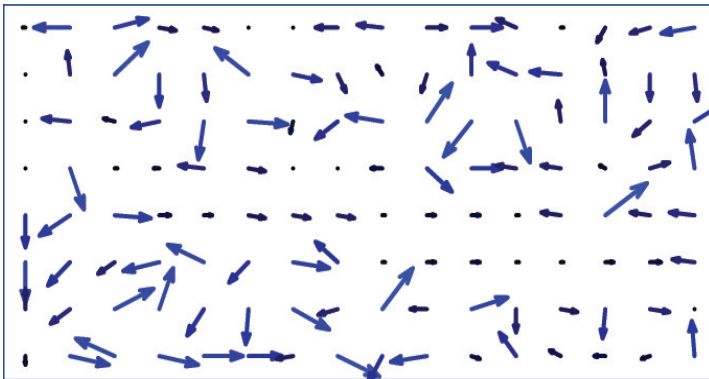Competition among
PIV- and PTV-Research
Teams Worldwide

LaVision submitted PIV results as the only commercial company and performed very well. These results were obtained by the following PIV evaluation algorithm:

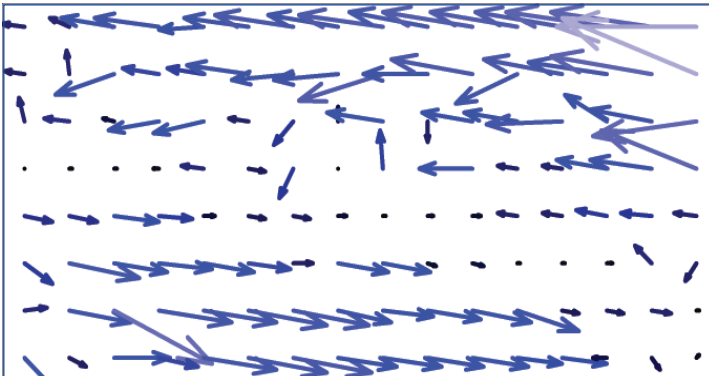▶ adaptive multi-pass with subpixel interrogation window shift and deformation

Main advantages:

▶ highly improved stability $\longrightarrow$ less false vectors
▶ increased accuracy, strongly reduced peak-locking
▶ able to follow strong velocity gradients
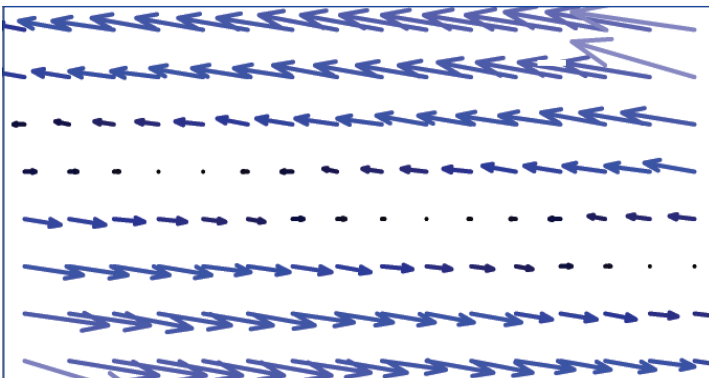
Image case E008 with 50% velocity gradient (synthetic)

standard piv correlation:
single pass 32x32, ovlp: 50%

adaptive multi-pass 32x32, 20 iterations without subpixel shift and deformation (only integer shift)

adaptive multi-pass 32x32, 15 iterations with subpixel shift and deformation
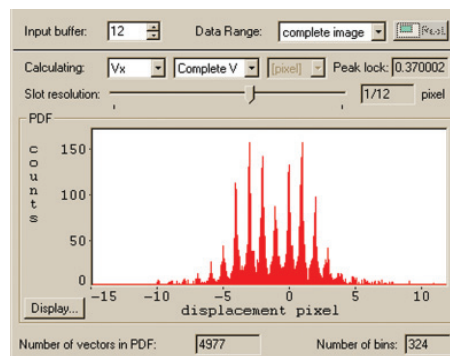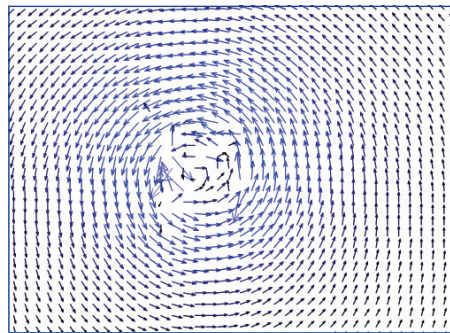
PIV Challenge 2001

In a worldwide cooperation 13 teams from Europe, Japan and USA participated in the PIV Challenge 2001 to compare their PIV and PTV algorithms. Besides LaVision as the only participating commercial company many well known PIV and PTV groups from universities and research institutions took part in this competition. About 25 image pairs consisting of experimental images as well as synthetically created images were given to the teams to evaluate them in a precisely defined way. The teams submitted the results of the PIV and PTV evaluation to the organizing committee which compared the vector fields in different ways. The results were presented at the PIV Challenge meeting before the PIV'01 conference at DLR (German Aerospace Center) in Göttingen, September 2001.

LaVision entered the competition with PIV results and performed very well among the teams with the most accurate evaluations! It turned out that especially those teams like LaVision using adaptive multi-pass schemes with sub-pixel interrogation window shift and deformation provided the best results. This algorithm leads to less false vectors, less peak-locking effects and the software is able to cope even with severe velocity gradients. This result was consistent for most images provided.
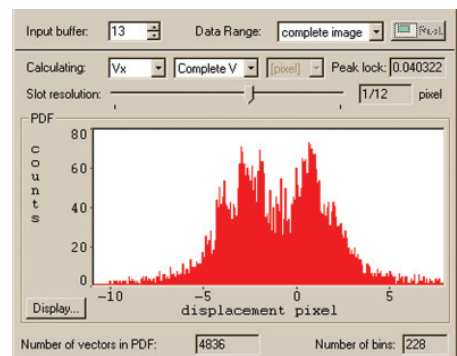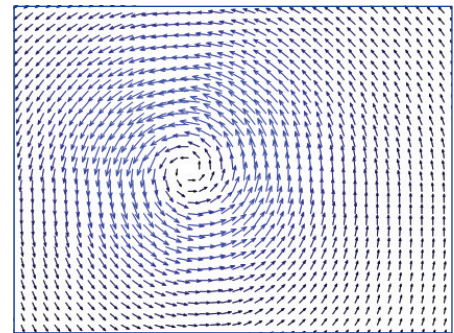
It is planned to publish the images and the results in the internet (www.pivchallenge.org) to make them available for evaluation and comparison. The subpixel window shift and deformation is included in DaVis 6.0, which is now available FOR FREE for all LaVision PIV users. As part of the challenge a common netcdf-file format was defined. Of course, with a future version of DaVis (6.2) you will also be able to read and write netcdf-files (note that the older netcdf-format used in Euro-PIV a few years ago is different).

Email from long time DaVis PIV user: *CONGRATULATIONS to this major improvement! Das PEAK-LOCKING ist praktisch weg!* (The peak-locking is effectively gone!)

Image case A001 (real vortex)

single pass 32x32, ovlp: 50%, strong peak locking (no postprocessing)

adaptive multi-pass, 3 iterations with subpixel shift and deformation, small residual peak locking due to small particles