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**Errors in PIV measurements of turbulence** DAVID DENNIS, TIMOTHY NICKELS, University of Cambridge — As particle-image velocimetry is used to study complex fluid flows, especially turbulent ones, it becomes increasingly important to ensure the fidelity of the data produced by the method. When the purpose of a PIV experiment is to investigate the nature of turbulence itself, rather than the bulk properties of the flow, errors that were previously negligible become significant. From simply considering a flow where the velocity fluctuations are 5% of the mean flow (for example the wall-normal fluctuations in a boundary layer or channel flow) it is apparent that any errors are twenty-times larger relative to the turbulent fluctuations than they are to the mean flow. The problem is exacerbated by the very nature of turbulence. Turbulent fluctuations can be superficially viewed as small, apparently random, disturbances about more manifest flow characteristics. The analogy to errors being small, apparently random, fluctuations about a manifest "correct" solution is obvious. It is possible that these similarities lead to errors being overlooked because they are adequately "disguised" as turbulent fluctuations. The nature of such errors and methods for minimising them will be discussed.

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