The Pirouette effect in turbulent flows ALAIN PUMIR, Ecole Normale Superieure de Lyon and CNRS, HAITAO XU, EBERHARD BODENSCHATZ, Max-Planck Institute for Dynamics and Self Organisation, Goettingen, Germany — The dynamics of the velocity gradient tensor plays a crucial role for our understanding of turbulent flows. I will discuss recent numerical and experimental results concerning the "perceived velocity gradient tensor," constructed with the help of 4 points (a tetrad). This tensor depends on the overall size of the tetrad, thus permitting to study the properties of the flow as a function of scale. I will in particular consider the statistical properties, as well as the dynamical properties of the velocity gradient tensor, in relation to the dynamics of the shape of the tetrad. These properties shed some new light on the intriguing preferential alignment between vorticity and the eigenvector, corresponding to the intermediate eigenvalue of the strain.

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