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Portfolio Paper

Visualization of Swirling Flows in Champagne Glasses

Polidori, G.*[1], Beaumont, F.*[1], Jeandet, P.*[2] and Liger-Belair, G.*[2]
*1 Laboratoire de Thermomécanique, UFR Sciences, 51100 Reims, France.
E-mail: guillaume.polidori@univ-reims.fr
*2 Laboratoire d' Œnologie et Chimie Appliquée, UFR Sciences, 51100 Reims, France.
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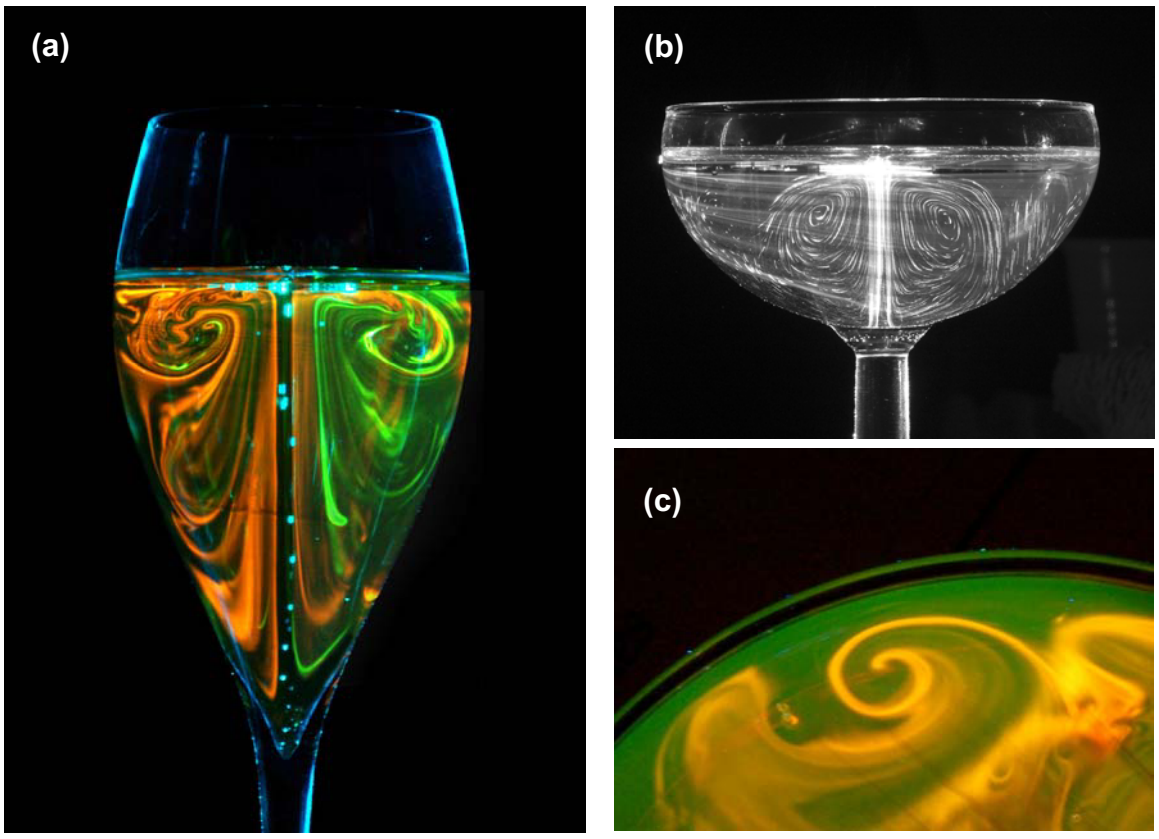

Fig. 1. Coherent structures in engraved glasses: (a-b) annular flows, surface flow instabilities (c).

For the very first time, classical flow visualization techniques were employed to capture the fluid motion in traditional *flutes* and *coupes* poured with champagne[(1), (2)]. These techniques have also been used to underscore the impact of glass shape and glass engravement conditions on the role of flow mixing phenomena on the flavours and aroma exhalation process. To better highlight the fluid dynamics inside a glass, laser tomography combined with fluorescent dyes (sulforhodamine B and fluoresceine, see Figs. 1(a) and (c)) and solid Rilsan tracers (Fig. 1(b)) has been used to give the quasi-instantaneous velocity field and the vorticity convection as well. Once poured with champagne, the glass is lighted in its symmetry plane with a 1 mm planar laser sheet. Because glasses are usually circularly engraved at their bottom, the resulting flow exhibits an annular behaviour clearly evidenced in Figs. 1(a) and (b). Equally surprising is the presence of surface hydrodynamic instabilities at the glass periphery whose details are revealed in Fig. 1(c).

If Champagne remains the wine of celebration undoubtedly due to its bubbling behaviour, it should also be for the splendor of its swirling motion

References : (1) Liger-Belair, G. et al., J. Agric. Food Chem., 55 (2007), 882-888. (2) Liger-Belair, G. et al., Langmuir, 23 (2007), 10976-10983.