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Shock-bubble interactions. (English) [Zbl 1299.76125](#)

Davis, Stephen H. (ed.) et al., Annual review of fluid mechanics. Vol. 43. Palo Alto, CA: Annual Reviews (ISBN 978-0-8243-0743-1/hbk). Annual Review of Fluid Mechanics 43, 117-140 (2011).

Summary: When a shock wave propagates through a medium of nonuniform thermodynamic properties, several processes occur simultaneously that alter the geometry of the shock wave and the thermodynamic state of the medium. These include shock compression and acceleration of the medium, refraction of the shock, and vorticity generation within the medium. The interaction of a shock wave with a cylinder or a sphere (both referred to as a bubble in this review) is the simplest configuration in which all these processes take place and can be studied in detail. Shock acceleration leads to an initial compression and distortion of the bubble, followed by the formation of a vortex pair in the two-dimensional (2D) case and a vortex ring in the 3D case. At later times, for appropriate combinations of the incident shock strength and density contrast between the bubble and ambient materials, secondary vortices are formed, mass is stripped away from the original bubble, and mixing of the bubble and ambient fluids occurs.

For the entire collection see [\[Zbl 1208.00024\]](#).

MSC:

[76L05](#) Shock waves and blast waves in fluid mechanics

[76J20](#) Supersonic flows

[76T10](#) Liquid-gas two-phase flows, bubbly flows

Cited in **32** Documents

Keywords:

[shock-induced turbulence](#); [shock-wave interaction](#); [shock tubes](#); [vortex dynamics](#); [supersonic flows](#)

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