# HYDRODYNAMIC INSTABILITIES AT A SHOCK ACCELERATED BUBBLE GAS-GAS INTERFACE

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## I- Schematic representations of the interaction between a shock wave and a gas bubble

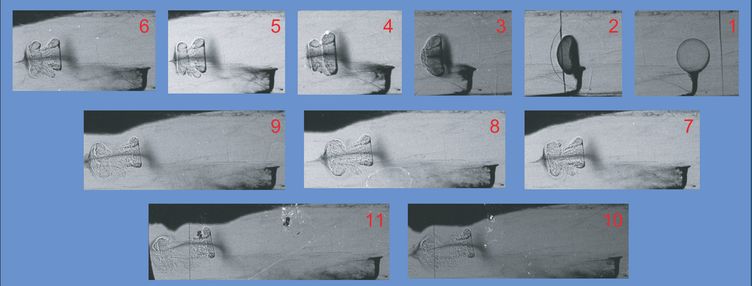
**slow/fast or heavy/light case: helium bubble in air**

t — Shock wave is coming from right to left — 0

Bubble is growing from right to left

**fast/slow or light/heavy case: freon 22 in air**

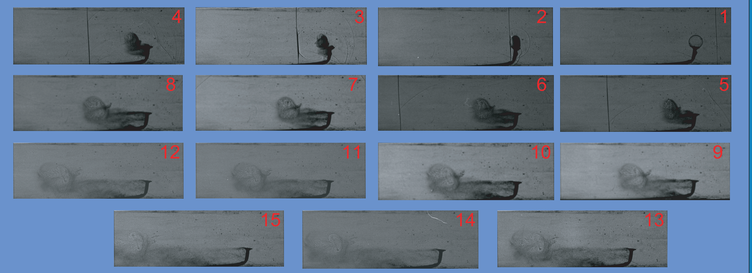
## II- Shadowgraphs of the interaction between a shock wave in air (Mach 1.5) and a helium bubble (run #156)




**Experimental conditions:**
- Incident shock wave Mach number in air: 1.5
- Bubble diameter: 28 mm
- Initial pressure of air and helium: 1 bar
- 70 µs between 2 consecutive pictures

*Picture's default are coming from too slow opening of the shutter*

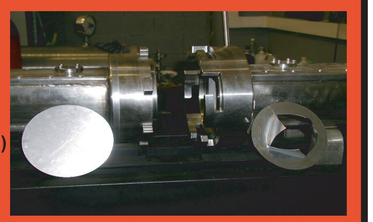
## III- Shadowgraphs of the interaction between a shock wave in air (Mach 1.5) and a krypton bubble (run #153)

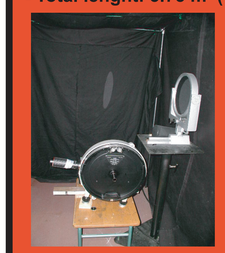



**Experimental conditions:**
- Incident shock wave Mach number in air: 1.5
- Bubble diameter: 18 mm
- Initial pressure of air and krypton: 1 bar
- 70 µs between 2 consecutive pictures

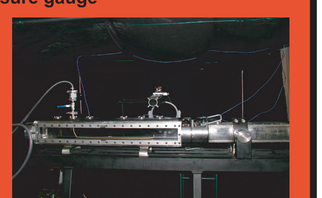
## IV- Experimental device

***Characteristics of the shock tube:***
- Square cross section: 8 x 8 cm2
- Shock wave Mach number: up to 5
- Total lenght: 3.75 m ( 25 cm of visualization field)



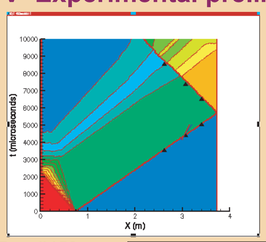


***Diagnostic system:*** **shadowgraph photography**
- Nanolite 20 kHz maximum frequency
- Strobodrum camera
- Acquisition device: tecktronix 720 scope
- Trigger: signal from PCB pressure gauge

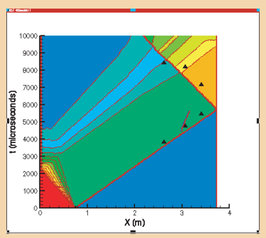


***Bubble system:***
- 50% solution in water of shampoo
- 1 cm diameter bubble support
- Pressure reducer : 1.2 bar (He) - 1.05 bar (Kr)

## V- Experimental preliminary results

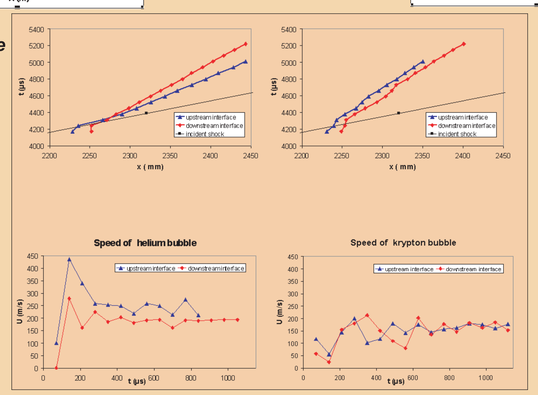



***Wave diagrams***




***Run #152***
***Helium bubble***

***Run #153***
***Krypton bubble***




## VI- Next steps

***Improvements:*** - Bubble injection system design
- Shampoo solution

***Experimental Program:*** - Heavy/light case
- Close densities case
- Light/heavy case

***Installation of the system on the new large diameter shock tube***
- 500 mm diameter circular section
- Length: 12 meters
- Visualization field: Lenght: 475 mm, Height: 322mm, Width: 282 mm