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Production of diverging and converging spherical shock waves and eccentric interaction of converging shock waves with cylindrical interfaces

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Introduction

- **Upon focusing of spherical or cylindrical shock waves, high pressures and temperatures created at the center of convergence and have been used for various scientific and industrial applications.**
- **It is not necessarily easy in laboratories to produce uniformly converging shock waves.**
- **Applications of R-M instability appearing in converging spherical and cylindrical geometries, such as inertial confinement fusion, supersonic combustion, and astrophysics, made it of considerable interest.**
- **In the present research, results of recent experiment of R-M instability will be reported.**

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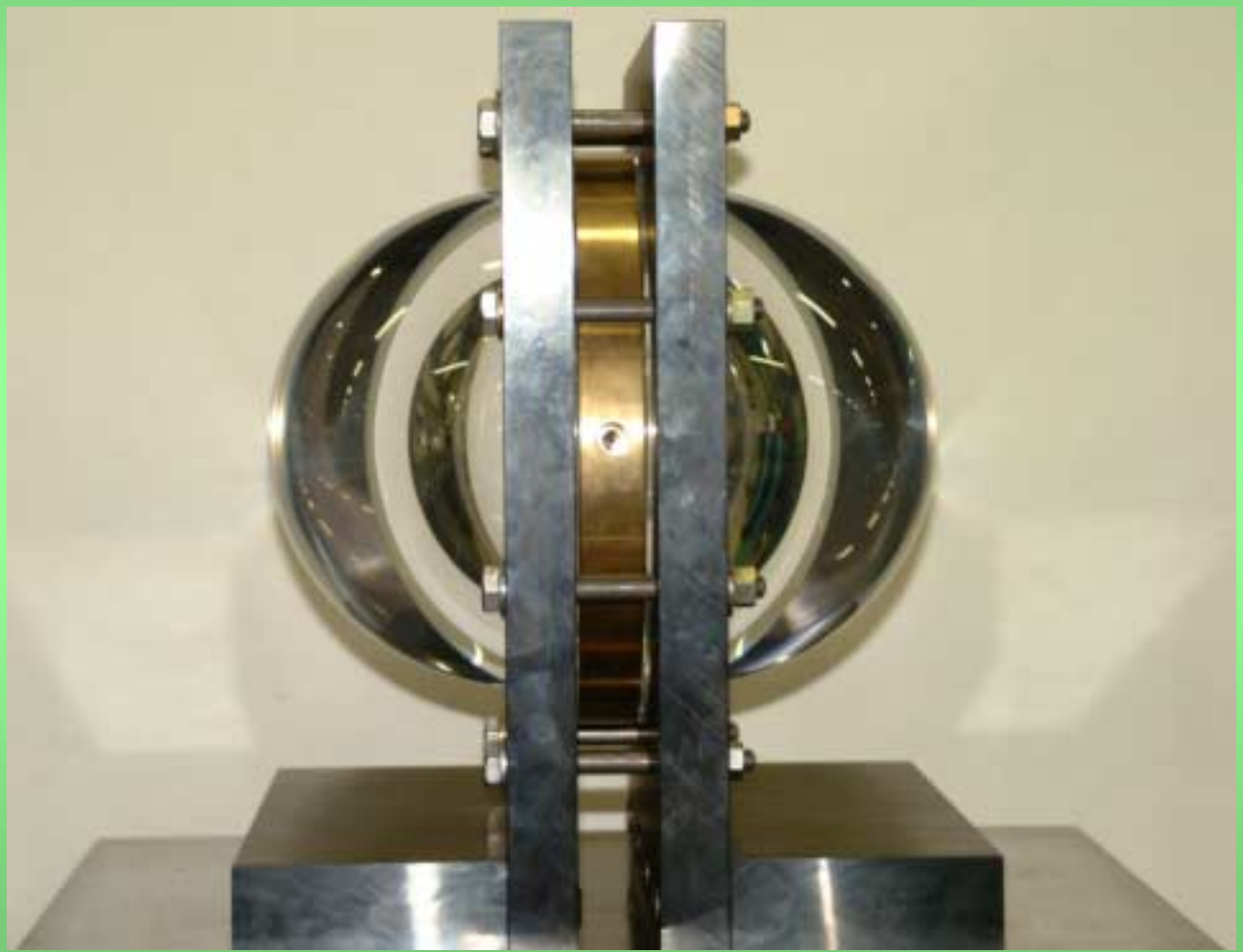
Aspheric spherical test section



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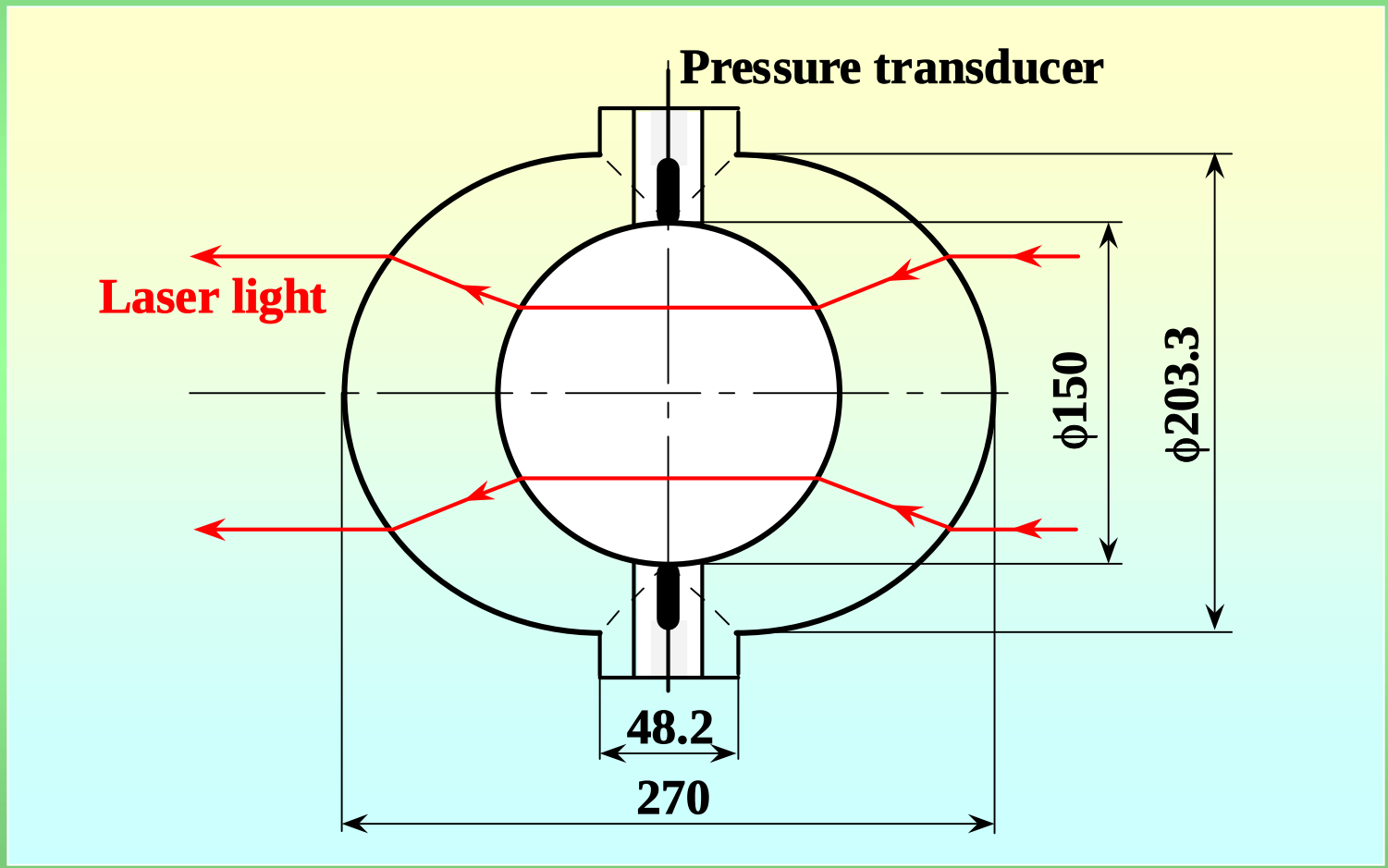
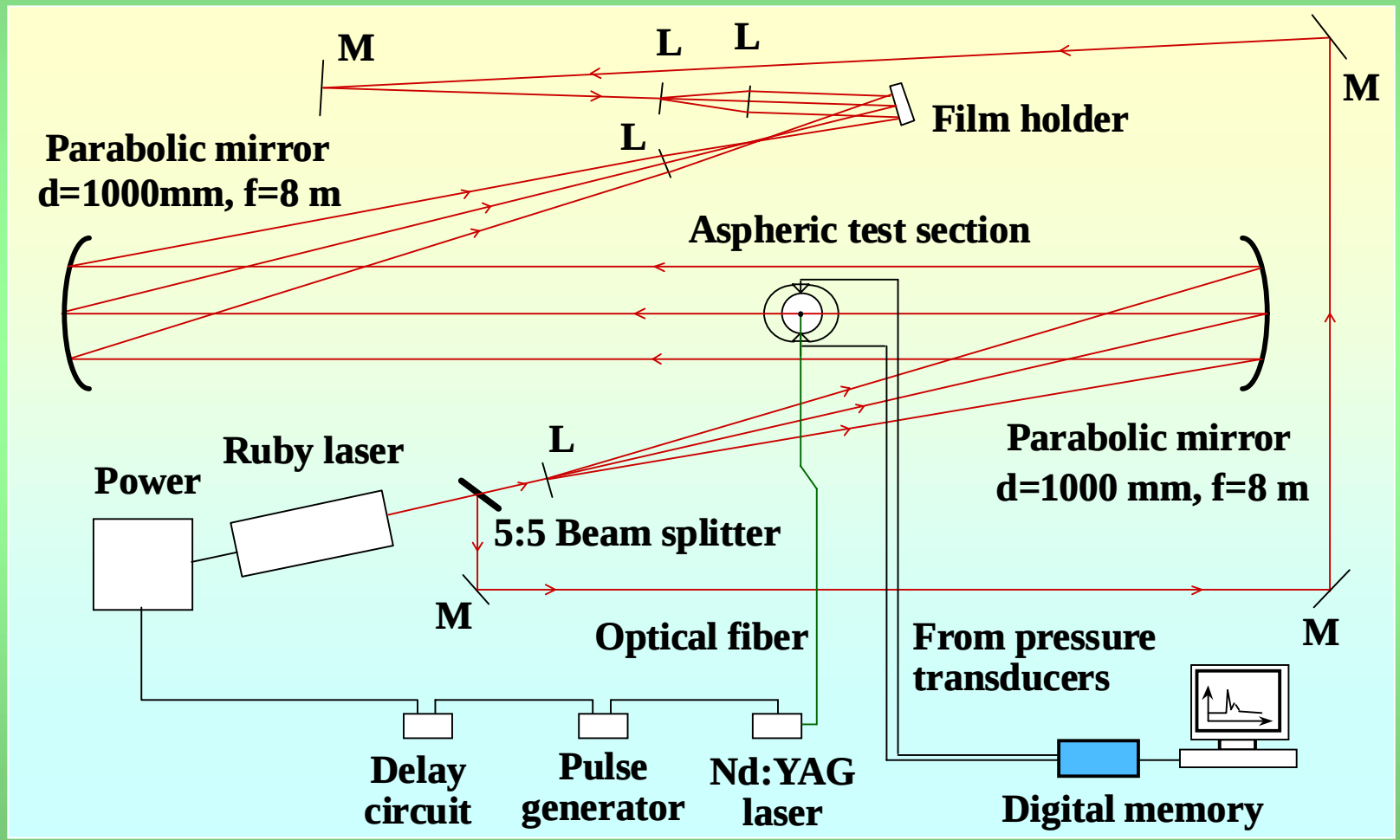
Front view of the aspheric spherical test section

Laser light rays in the aspheric test section



Double exposure holographic interferometric optical set-up



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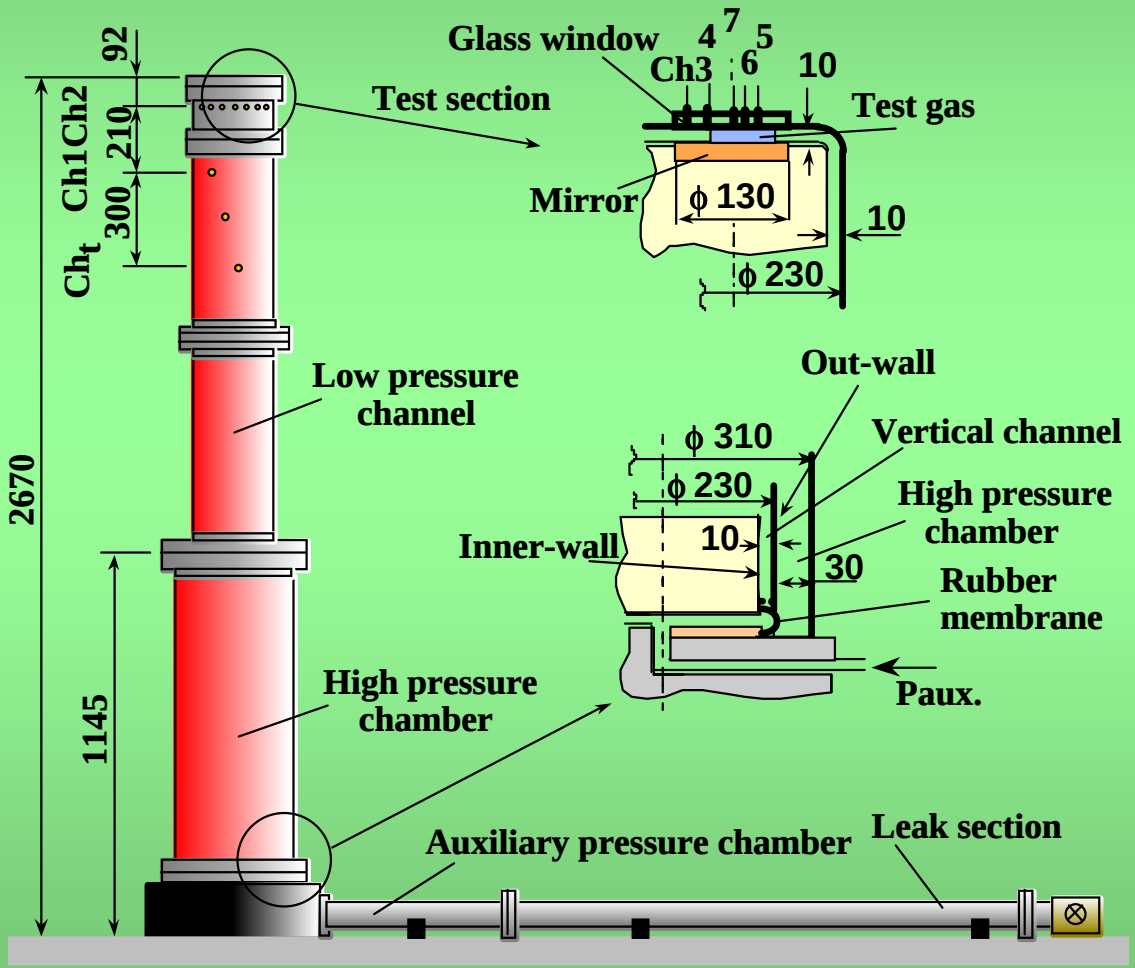
Structure of vertical diaphragmless shock tube



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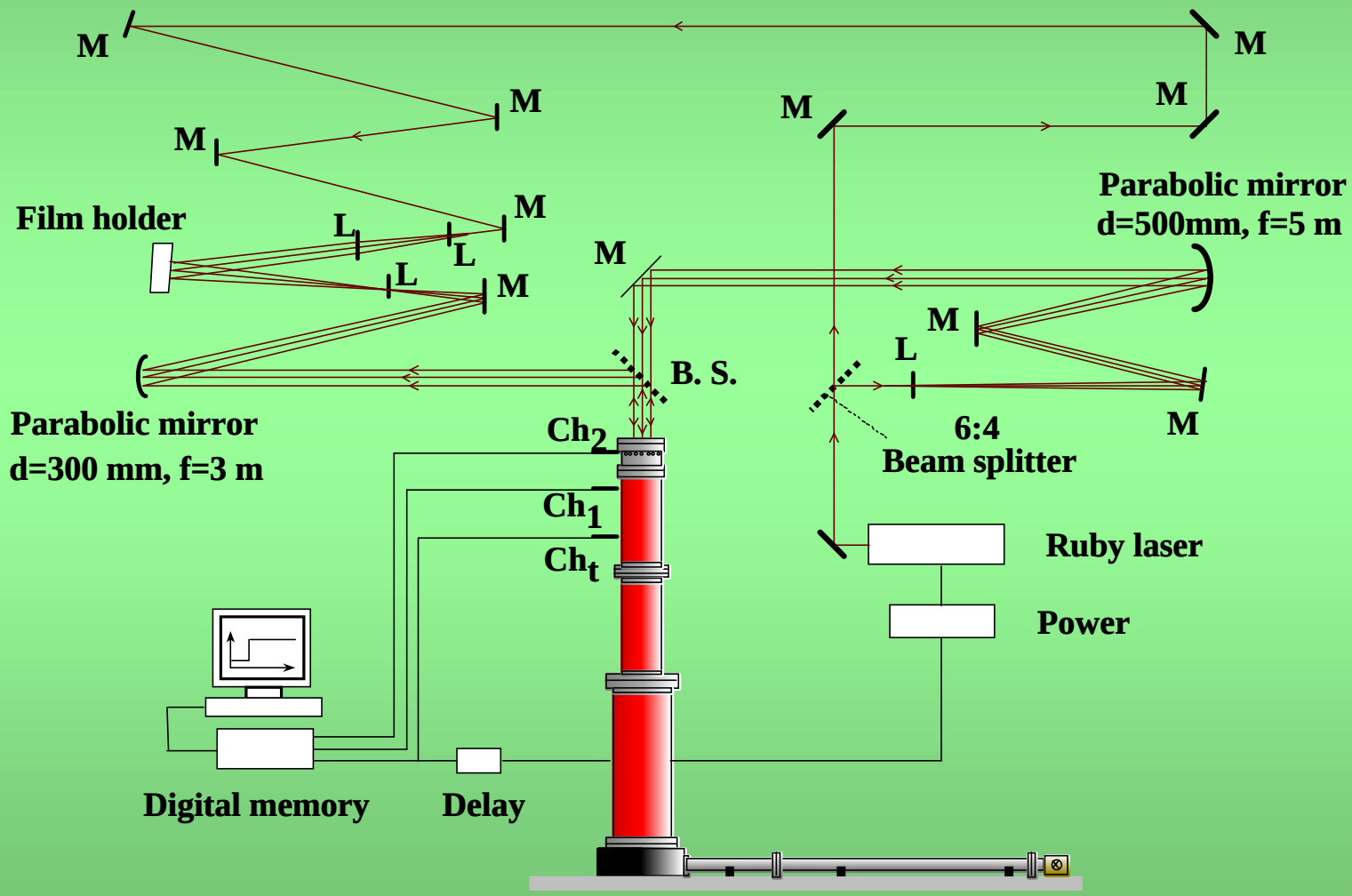
Double exposure holographic interferometry



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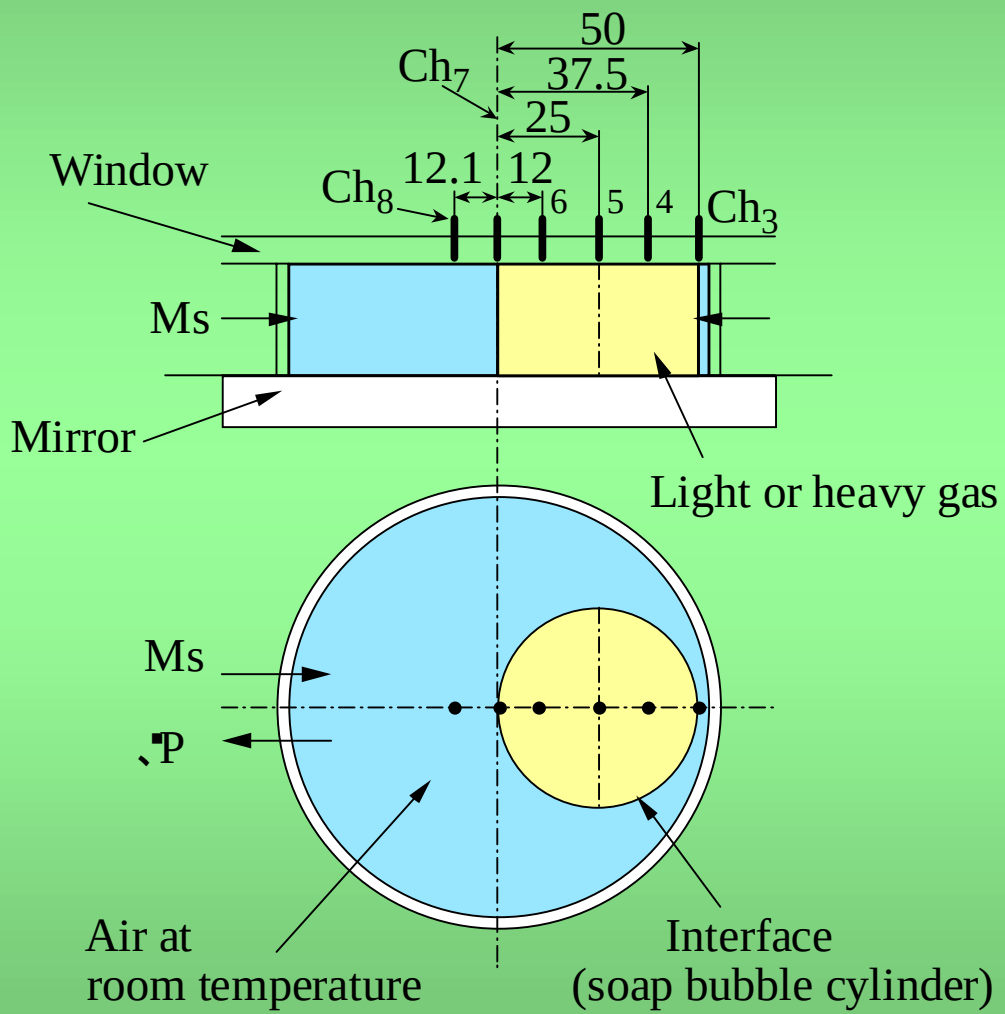
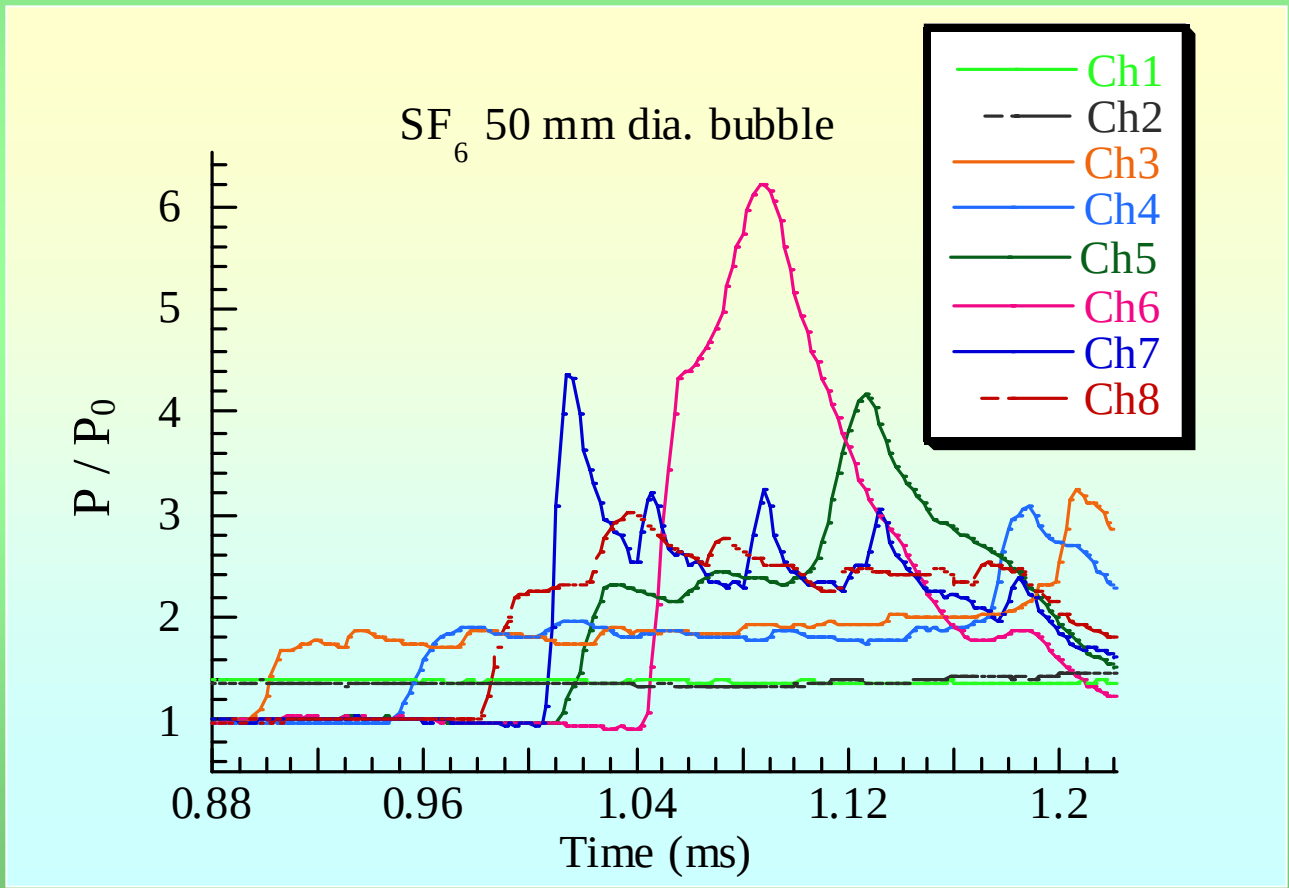
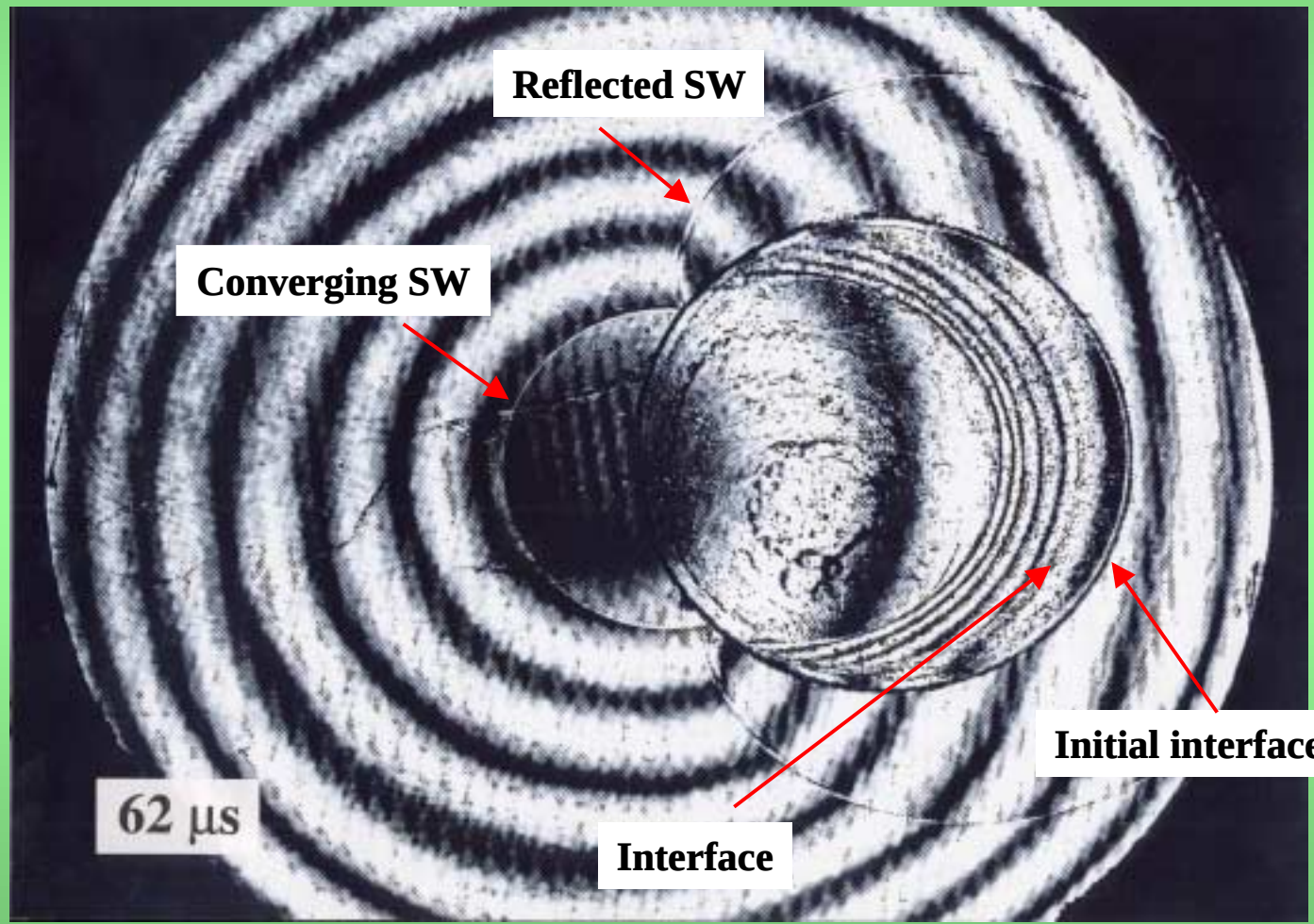
Test section with cylindrical bubble



Pressure histories at the test section for eccentric interaction of cylindrical shock wave with cylindrical SF_6 bubble, Ms_i=1.18, P_0=101.13 kPa



Ms_i=1.18 in air, P_0=100.3 kPa, D_{SF_6}=50mm



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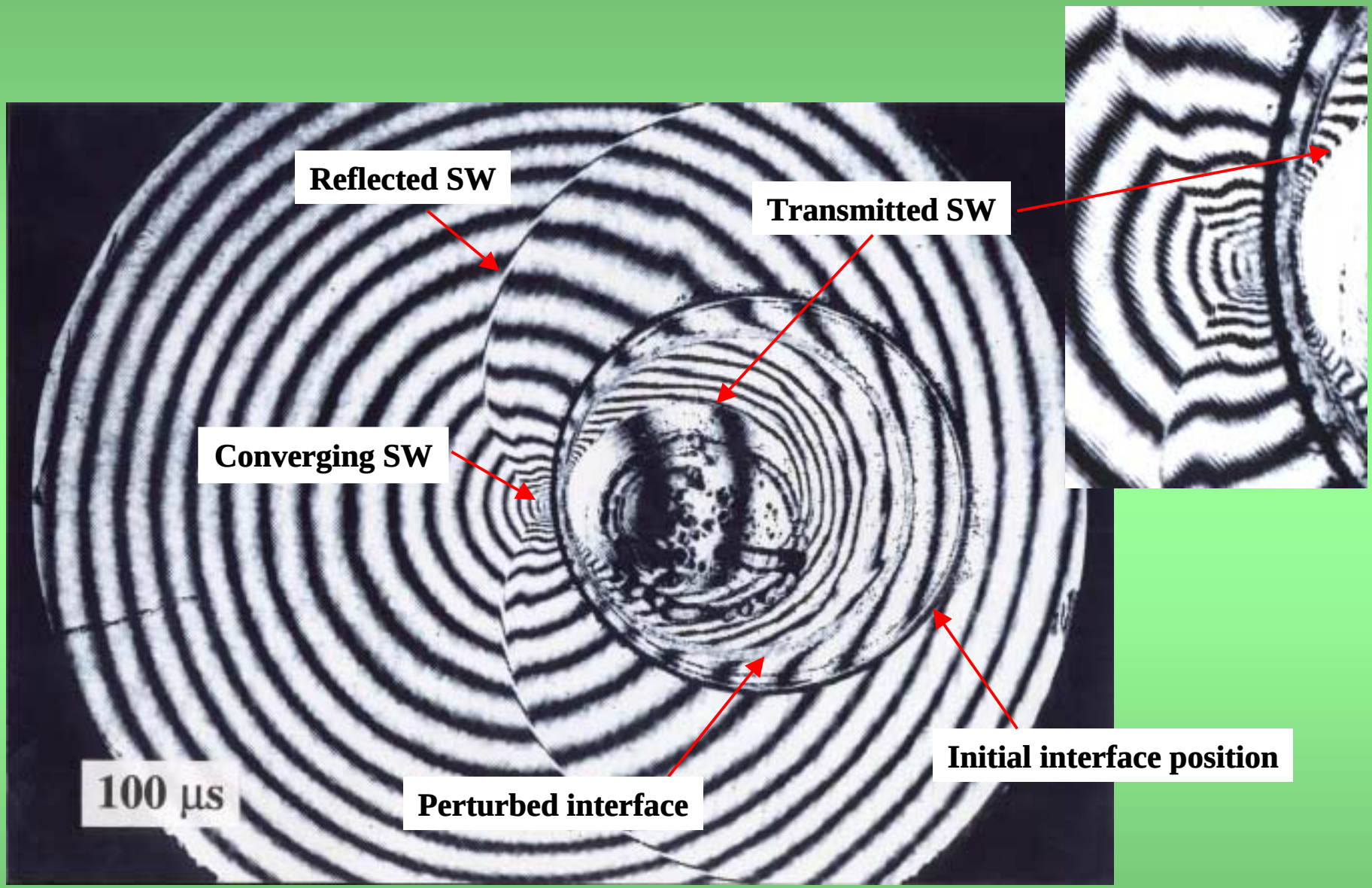

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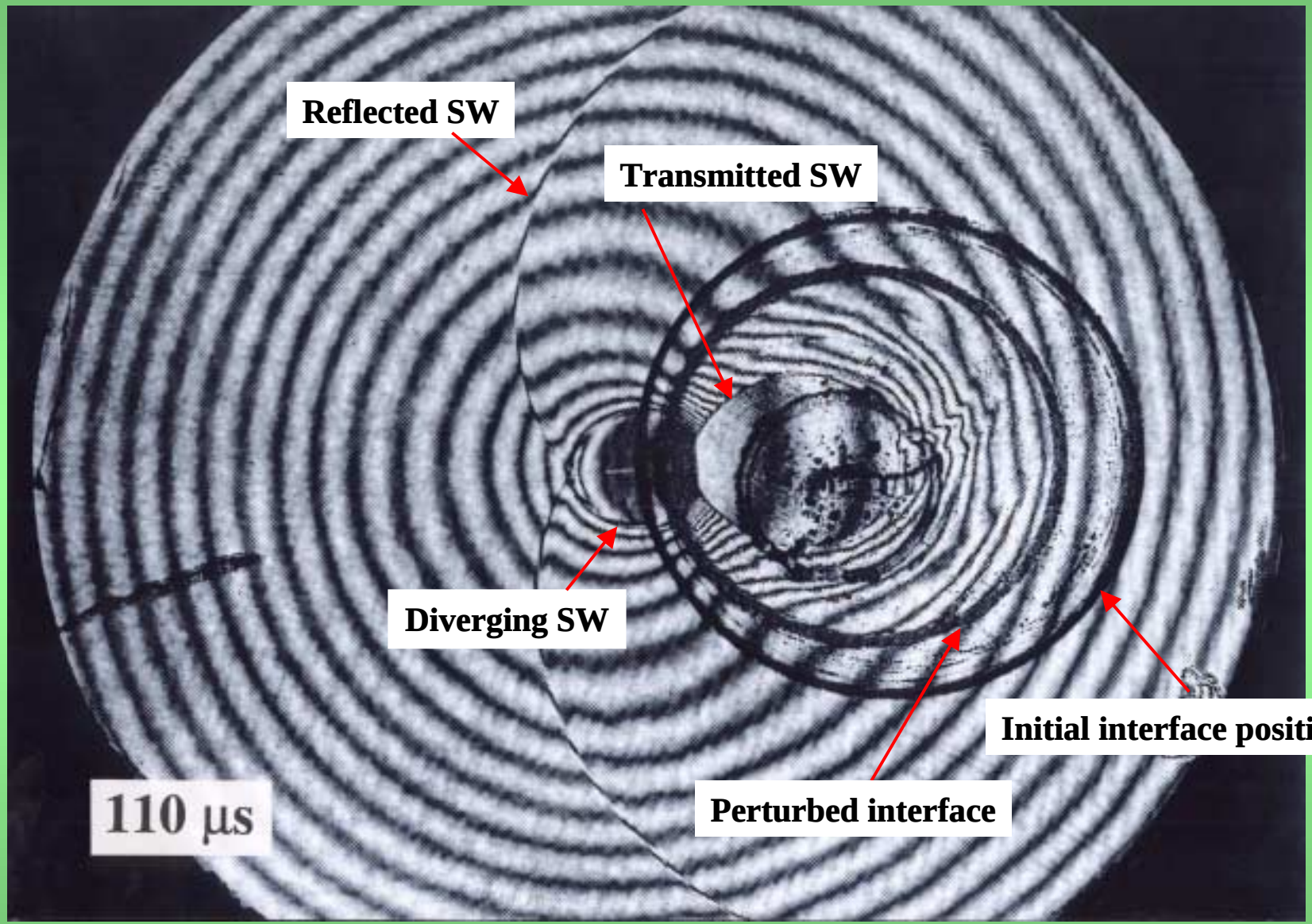

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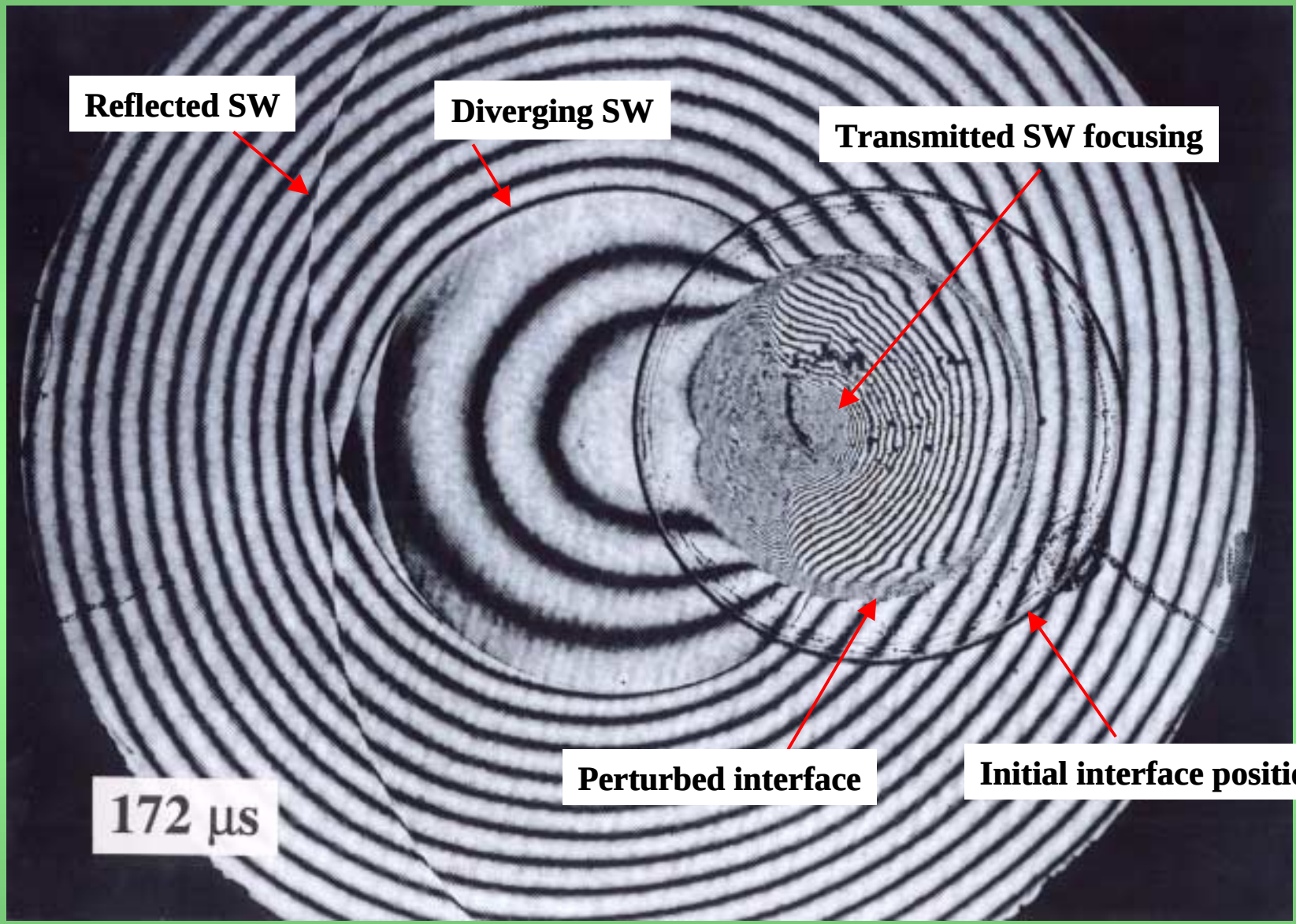

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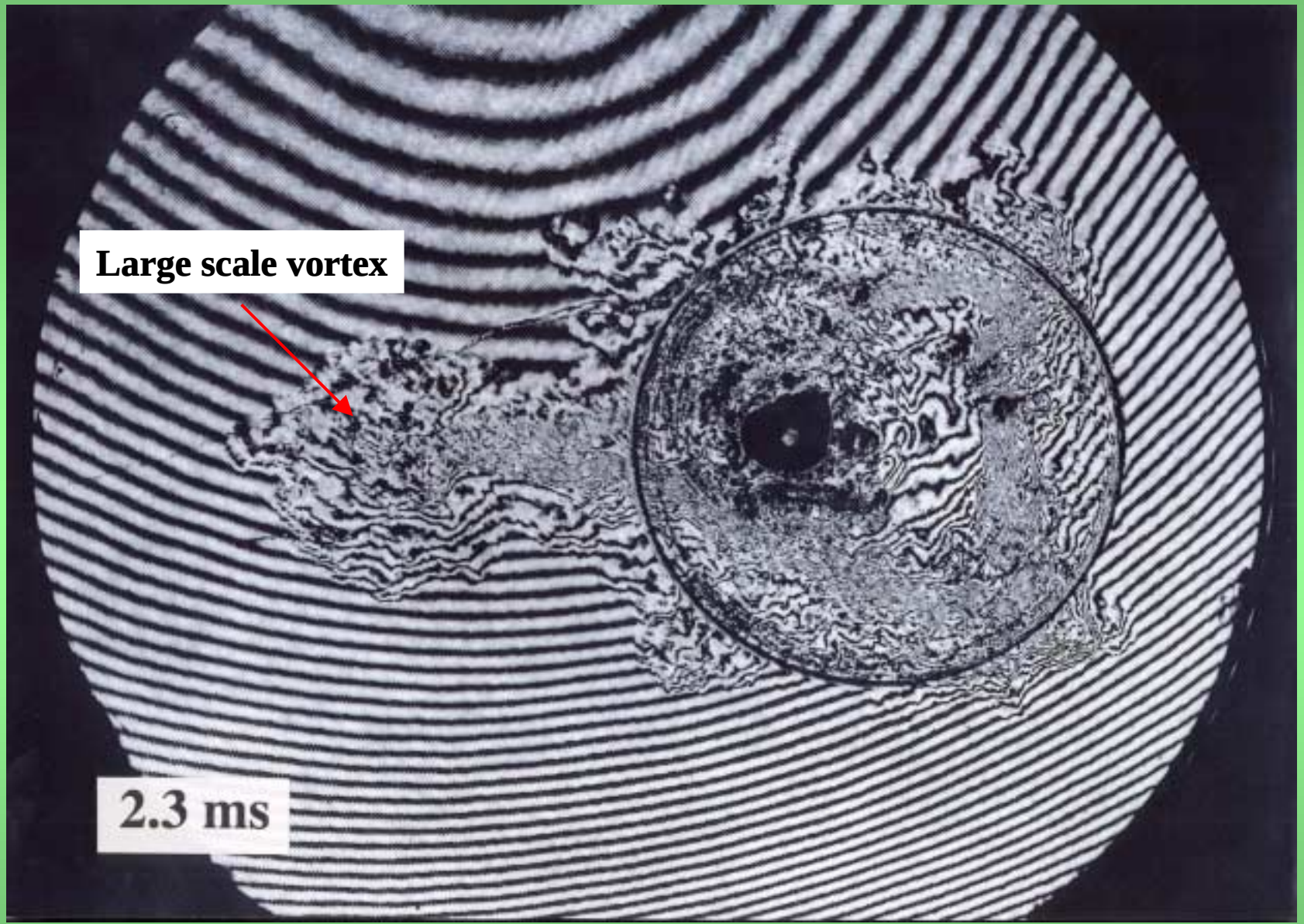

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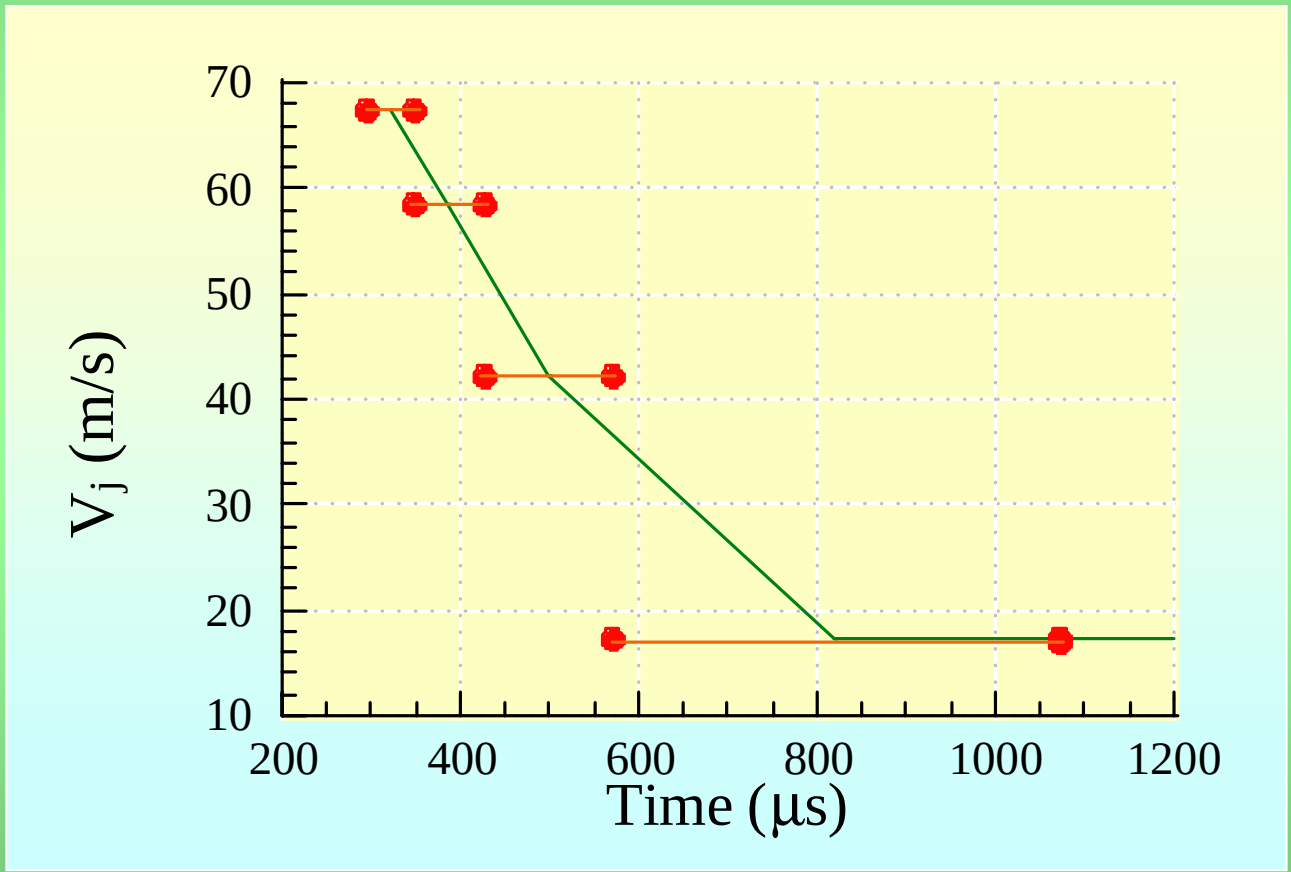
Time variation of average SF_6 jet velocity in air



Summary

1) **Converging spherical shock waves and their interaction with micro-explosive product gases were investigated by using a spherical transparent test section.**

2) **Using double exposure holographic interferometry, the interactions of converging shock waves with light/heavy cylindrical gaseous interface were quantitatively visualized. A relatively strong secondary shock wave focusing in SF_6 heavy gas bubble resulted a strong SF_6 jet in air, which made the final distortion of the bubbles to be different from planar shock wave loading.**

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