Studies on oblique impinging subsonic and sonic jets

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This paper describes an experimental investigation on the normal and oblique subsonic and underexpanded jet impingement. The shadowgraph pictures of normal and oblique impingement show that the stand-off shock at the wall remains parallel to the nozzle exit plane when the wall is moved away from the nozzle exit. The jet field is investigated based on the field characteristics such as spread, wall half-pressure width and wall pressure similarity. The jet spread is strongly influenced by obliqueness of the wall, whereas the wall pressure similarity is independent of obliqueness. The positive pressure zone at the center of impingement planes disappears for a wall at 10 times nozzle exit diameter for subsonic impingement, whereas for underexpanded it disappears as early as 4 times the nozzle exit diameter.

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