Abstract View

Volume 17, Issue 4 (April 1987)

Journal of Physical Oceanography
Article: pp. 483–491 | Abstract | PDF (732K)

Rotating Shocks in a Separated Laboratory Channel Flow

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(Manuscript received June 3, 1986, in final form October 17, 1986)

DOI: 10.1175/1520-0485(1987)017<0483:RSIASL>2.0.CO;2

ABSTRACT

Laboratory studies of the effects of wall separation on a hydraulic jump in a rotating channel of rectangular cross section are described. Separation is induced by increasing the rotation rate while maintaining a constant flow rate through the channel. It is found that separation can occur in the supercritical flow upstream of the jump but not in the subcritical downstream flow. At high rotation rates the 'jump' becomes one of stream width rather than depth, and the associated turbulent eddies occur in the vertical plane rather than in the horizontal plane. Although depth changes occur across the jump, these changes are gradual and wavelike.

A simple shock-joining theory indicates that stationary shocks with separated upstream flow and attached downstream flow are possible within a certain range of upstream Froude and Burger numbers. This result supplements a theory due to Nof which indicates that stationary shocks are not possible when both upstream and downstream flows are separated.