Shock formation by compressible vortex ring impinging on a wall

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The flow field induced by a high speed vortex ring approaching a solid wall has been experimentally and numerically studied. The type of vortex ring treated here is generated by a shock produced in a shock tube and then emitted from the tube into the atmosphere. The flow field near the wall has been clarified from the experimental and numerical results. As the vortex ring approaches the wall, a wall boundary layer is induced; thereby a wall vortex is formed. Moreover, a shocklet is generated in the narrow region between the vortex ring and wall vortex. In addition to this shocklet, another shocklet is produced between the vortex core and the separation point of the boundary layer. Concerning the flow field other than near the wall, shock focusing produced by a triple point induced by shocklet interaction is discussed.