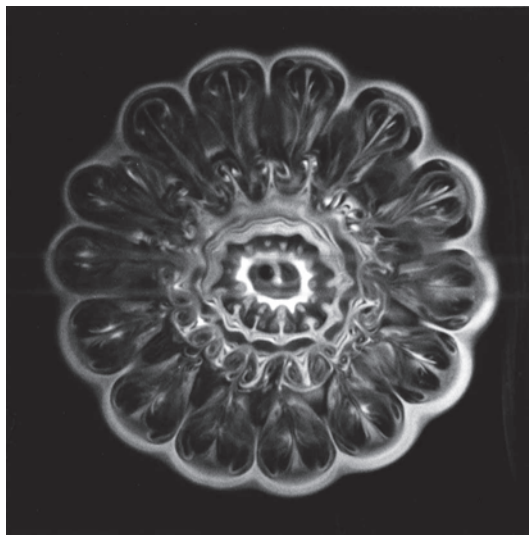


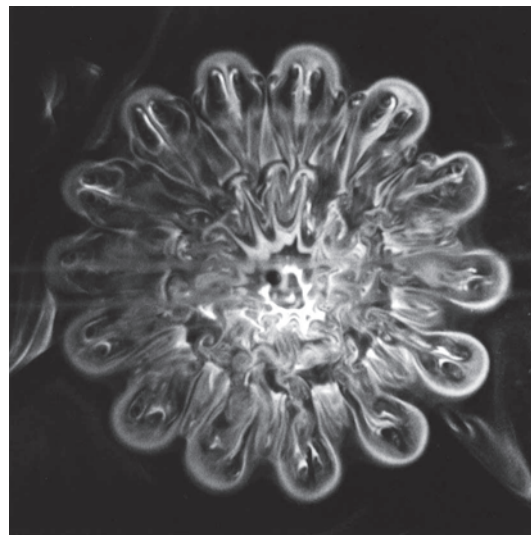
### 3. Longitudinal Vortex Structure in the Flow Field Produced by a Vortex Ring Impinging on a Flat Plate

Naitoh, T.<sup>1)</sup>, Banno, O.<sup>1)</sup> and Yamada, H.<sup>1)</sup>

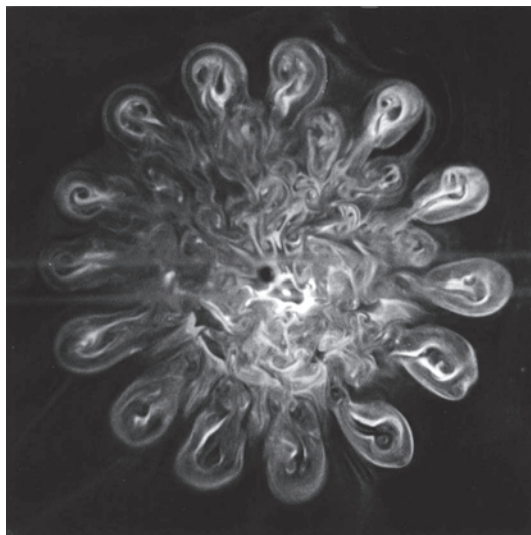
1) Department of Systems Engineering, Nagoya Institute of Technology, Gokiso-cho, Showa-ku, Nagoya 466-8555, Japan.



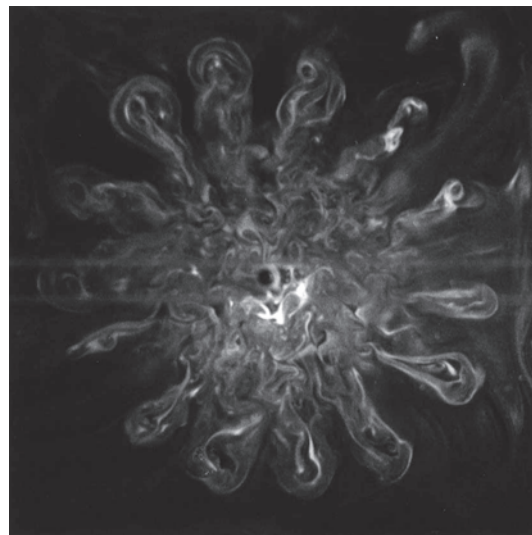
(a)  $t = 740$  ms



(b)  $t = 760$  ms



(c)  $t = 780$  ms



(d)  $t = 800$  ms

These pictures, obtained by a smoke visualization method, show the successive frontal cross sections of the flow field produced by a vortex ring impinging on a flat plate at  $Re = 2600$ , defined by traveling speed and diameter of the ring. Owing to the mutual interactions of the main and induced vortices, generated by the boundary layer separation on the impinging plate, the longitudinal vortex structure that we call fingers vortex appears. Because the fingers vortex possesses a vorticity component perpendicular to the vorticity lines of the toroidal structure of the main vortex, it plays a crucial role in forming azimuthal coherent structure with a cross section resembling that of an orange. Then this structure promotes the flow field into turbulent state.