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Portfolio

Azimuthal Flow Patterns Produced by Annular Swirling Jets

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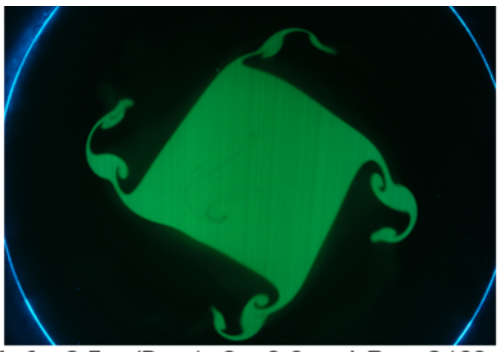
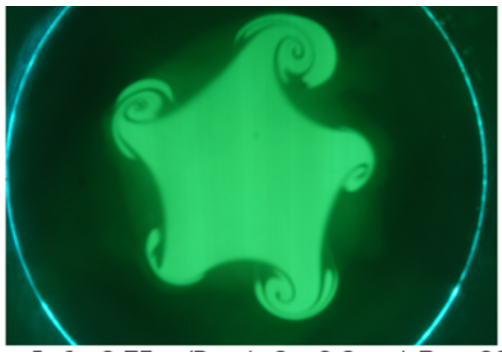
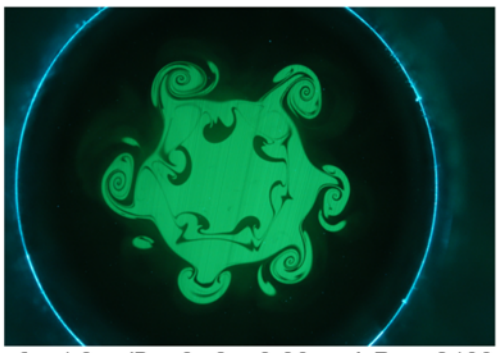


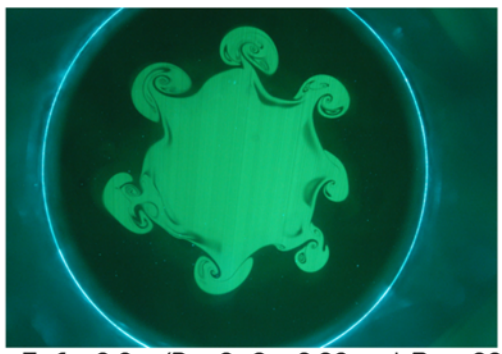
***m* = 4**, ξ = 2.5, x/D_i = 4, S = 0.6 and Re = 2460.



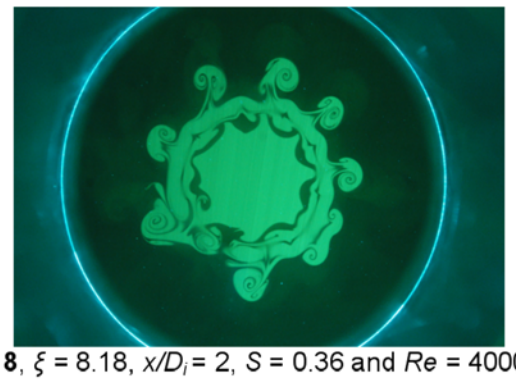
***m* = 5**, ξ = 3.75, x/D_i = 4, S = 0.2 and Re = 3000.



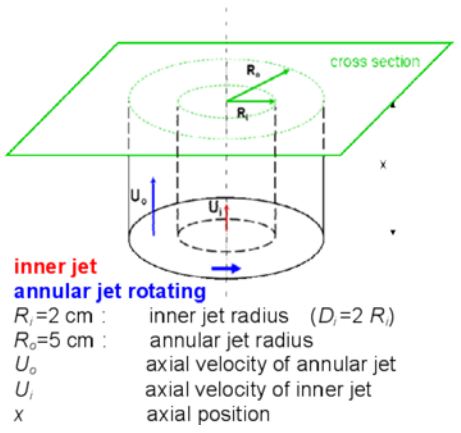
***m* = 6**, ξ = 4.3, x/D_i = 3, S = 0.38 and Re = 2460.



***m* = 7**, ξ = 6.8, x/D_i = 3, S = 0.36 and Re = 3600.



***m* = 8**, ξ = 8.18, x/D_i = 2, S = 0.36 and Re = 4000.



Visualizations of azimuthal flow patterns of annular swirling jets by laser tomography at cross-sections of different axial positions x/D_i are shown here. There are two cylindrical coaxial jets where only the annular jet is rotating. This configuration commonly occurs in industrial burners. Slight modifications of the flow parameters ($\xi = \dfrac{\overline{U_i}}{\overline{U_o}}$, $S = \max\left(\dfrac{U_\theta(r)}{U_x(r)}\right)$ and $\mathrm{Re} = \dfrac{U_x D_i}{\nu}$ with U_x the axial mean velocity and D_i the inner jet diameter) give different vortex modes m $\in$ {4, 5, 6, 7, 8}.