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Dynamics of Chains of Bubbles in a Hele-Shaw Cell EDUARDO RAMOS, Centro de Investigacion en Energia, Universidad Nacional Autonoma de Mexico, RAMON SANCHEZ, Instituto de Investigaciones Electricas, Mexico, MIGUEL GONZALEZ, Universidad LaSalle-Cuernavaca, JOSE RAMON HERRERA, Instituto de Investigaciones Electricas, Mexico — We report experimental observations of the dynamics of bubbles ascending in a Hele-Shaw cell filled with water. The bubbles are generated by injecting a continuous stream of air through a capillary of 70 μm of diameter at the bottom of the cell. Changing the air flow, bubbles are formed at rates of 0.65Hz, 4.0Hz and 12.0Hz, with diameters of approximately 3 mm. The trajectories of individual bubbles are zigzags with amplitudes of the order of magnitude of the diameter of the bubble. The bubble shapes are ellipses with major axis tilted with respect to the horizontal an angle that goes from approximately -40° to +40°. Also, the eccentricity of the ellipses changes as the bubbles ascend, with a value closer to unity at the inflection point of the zigzag trajectory. Flow visualization reveals that the wake of the bubbles is composed by vortices that are shed in a similar way as von Karman vortex street. At low departing frequencies, the bubbles follow each other moving along the same trajectories, but for the largest frequency, we found that in the region near the departure, the trajectories coincide but there is a vertical critical distance from where the trajectories of each individual bubble are different.

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