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Toroidal bubble entrapment under an impacting drop MARIE-JEAN THORAVAL, SIGURDUR T. THORODDSEN, King Abdullah University of Science and Technology (KAUST), Thuwal 23955-6900, Saudi Arabia, KOHSEI TAKEHARA, TAKEHARU GOJI ETOH, Kinki University, Osaka, Japan — We use ultra-high-speed imaging and numerical simulations (GERRIS, http://gfs.sf.net) to observe and analyze the formation of up to 14 air tori when a water drop impacts on a thin liquid film of water or other miscible liquids. They form during the early contact between the drop and the pool by the vertical oscillations of the ejecta sheet. They then break in micro-bubble rings by the Rayleigh instability. Their formation is associated with the shedding of an axisymmetric vortex street into the liquid from the free surface. These vorticity structures and their dynamics are made apparent by the dynamics of the micro-bubbles, added seed particles and the difference of refractive index for different liquids in the drop and the pool. More robust entrapments are observed for a thin film of ethanol or methanol. We show that while the non-spherical drop shape is not responsible for the toroidal bubble entrapments, the number of rings is increasing for more oblate drops. Individual bubble entrapments are also observed from azimuthal destabilizations of the neck between the drop and the pool. [M.-J. Thoraval, K. Takehara, T. G. Etoh, S. Popinet, P. Ray, C. Josserand, S. Zaleski and S. T. Thoroddsen (2012). von Kármán Vortex Street within an Impacting Drop. Phys. Rev. Lett., 108, 264506.]

Marie-Jean Thoraval
King Abdullah University of Science and Technology (KAUST),
Thuwal 23955-6900, Saudi Arabia

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