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Droplet Breakup Mechanisms in Air-blast Atomizers AMIR ABBAS ALIABADI, PhD Candidate Mechanical Engineering University of British Columbia, SEYED MOHAMMAD TAGHAVI, PhD Candidate Chemical Engineering University of British Columbia, KELLY LIM, BASc Candidate Mechanical Engineering University of British Columbia — Atomization processes are encountered in many natural and man-made phenomena. Examples are pollen release by plants, human cough or sneeze, engine fuel injectors, spray paint and many more. The physics governing the atomization of liquids is important in understanding and utilizing atomization processes in both natural and industrial processes. We have observed the governing physics of droplet breakup in an air-blast water atomizer using a high magnification, high speed, and high resolution LASER imaging technique. The droplet breakup mechanisms are investigated in three major categories. First, the liquid drops are flattened to form an oblate ellipsoid (lenticular deformation). Subsequent deformation depends on the magnitude of the internal forces relative to external forces. The ellipsoid is converted into a torus that becomes stretched and disintegrates into smaller drops. Second, the drops become elongated to form a long cylindrical thread or ligament that break up into smaller drops (Cigar-shaped deformation). Third, local deformation on the drop surface creates bulges and protuberances that eventually detach themselves from the parent drop to form smaller drops.

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