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Wave structure in Upwards Gas-Liquid Annular Flows YUJIE ZHAO, GEOFF HEWITT, OMAR MATAR, CHRISTOS MARKIDES, Imperial College London — A two-phase flow system in a vertical pipe in which the liquid around the pipe periphery is lifted by the gas core is referred to as an "upwards annular flow" (UAF). UAFs have a complex interfacial structure, which consists of short-lived, small-amplitude "ripple" waves, and large amplitude, high-speed "disturbances" waves. Two sets of flush-mounted electrically conducting probes together with axial view photography were used to study UAFs. The overall wave frequency decreased with increasing distance from the inlet until saturation. Disturbance waves were observed over a wide range (both low and high) of liquid Reynolds numbers, ReL, while ripples were observed at lower ReL. Disturbance "bursts," which are a source of liquid entrainment into the gas core, were also observed, with increasing frequency at progressively higher ReL. The waves appeared more chaotic near the inlet, which hindered the formation of the correlated waves. As the small (ripple) waves coalesced into bigger waves with increasing distance from the inlet, the waves became more coherent around the pipe periphery. The results that will be presented comprise: (i) statistical film thickness data, and (ii) wave, frequency, velocity, and wavelength.

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