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Flow and Sensible Heat Transfer to a Liquid Film Falling on Horizontal Tubes

ABSTRACT:

A liquid falling between horizontal tubes is known to manifest three main flow regimes (modes): the droplet mode, the column or jet mode, and the sheet mode. The flow regime has important implications on heat transfer and on the operation of falling-film heat exchangers in a range of applications. A discussion of these flows and their applications will be followed by a presentation of experimental work exploring the use of nanofluids in round-tube falling-film heat exchangers, and experimental work on the use of conventional fluids on unconventional tubes. Finally, a theoretical framework with a somewhat unusual basis will be proposed to explain the falling-film mode transitions.



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BIOGRAPHY:

After completing a doctorate at Purdue University, Anthony Jacobi joined the faculty of the Johns Hopkins University. He joined the University of Illinois at Urbana-Champaign in 1992, where he is currently the Krizter Distinguished Professor of Mechanical Engineering, Co-director of the Air Conditioning and Refrigeration Center (an NSF-founded I/UCRC), and Interim Associate Head for Graduate Programs and Research.