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Quantitative Visualization of transverse annular jets BRIAN VENTURA, California Institute of Technology, KLIULAI CHOW-YEE, UC Berkeley, JASON DAMAZO, PHILIPP BOETTCHER, JOSEPH SHEPHERD, California Institute of Technology, IOANNIS MIKELLIDES, DAVID VAUGHAN, NASA-JPL — Transverse injection of fluid into an annular jet is a mechanism resulting in good mixing and is therefore utilized in engineering applications such as pintle rocket engines. Vigorous mixing occurs between the two jets. However, much of what we know about the flow behavior of such devices has been learned empirically with very limited studies exploring the fluid dynamics. The geometry under investigation is an axisymmetric radial jet of variable width impinging on a fixed annular jet. The main capability of the current facility is to reproduce start-up and quasi-steady flow conditions through the use of a fast acting valve which opens a pressurized air reservoir. The flow is then observed using laser interferometry giving quantitative measurements of the density fields that are compared with computations. The main parameters under investigation were the reservoir pressure and the area ratio between the axial and radial jet. Modeling of the fluid mechanics was performed at NASA-JPL.

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