Efficient Nonlinear Atomization Model for Thin 3D Free Liquid Films CARSTEN MEHRING, Colorado School of Mines — Reviewed is a nonlinear reduced-dimension thin-film model developed by the author and aimed at the prediction of spray formation from thin films such as those found in gas-turbine engines (e.g., prefilming air-blast atomizers), heavy-fuel-oil burners (e.g., rotary-cup atomizers) and in the paint industry (e.g., flat-fan atomizers). Various implementations of the model focusing on different model-aspects, i.e., effect of film geometry, surface tension, liquid viscosity, coupling with surrounding gas-phase flow, influence of long-range intermolecular forces during film rupture are reviewed together with a validation of the nonlinear wave propagation characteristics predicted by the model for inviscid planar films using a two-dimensional vortex- method. An extension and generalization of the current nonlinear film model for implementation into a commercial flow- solver is outlined.

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