Abstract Submitted
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Growth and densification of frost around a circular cylinder under humid air on cross flow[1] VICTOR MADRID, FAUSTO SANCHEZ, SIMON MARTINEZ, ARTURO MORALES, UNIVERSIDAD AUTONOMA DE NUEVO LEON, FIME — Formation, growth and densification of frost around a circular cylinder under humid air on cross flow at different Reynolds numbers has been numerically studied using the finite volume method. The frost formation phenomenon takes place when humidity goes through a desublimation phase change at a temperature lower than its solidification point. Continuity, momentum, energy and mass transport equations have been solved for a whole domain including both phases, gas and solid, and the two components in the gas phase, i.e. dry air and humidity. The mass of water that goes from the gas to the solid phase is used as a source term in the mass conservation equation for solid phase and as a sink for the gas phase, affecting source terms in all the other conservation equations (energy and momentum) also. A volume of fraction conservation equation for solid phase is used to obtain local fractions of ice droplets, considering formally as frost those fraction values greater than a critical value. Once those local fractions are known, local frost properties such as density and thermal conductivity can be calculated as functions of the phase fraction allowing to compute the evolution of growth and local properties of frost.

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Victor Madrid
UNIVERSIDAD AUTONOMA DE NUEVO LEON, FIME

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