

Abstract Submitted  
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**Edge effects on water droplet condensation** LAURENT ROYON, M.S.C. University Paris Diderot, ANNE MONTGRUEL, P.M.M.H. ESPCI, MARIE GABRIELLE MEDICI, L.P.S.M. University of Nice, DANIEL BEYSENS, P.M.M.H. ESPCI — The effect of geometrical or thermal discontinuities on the growth of water droplets condensing on a cooled substrate is investigated. Edges, corners, cooled/non cooled boundaries can have a strong effect on the vapor concentration profile and mass diffusion around the drops. In comparison to growth in a pattern where droplets have to compete to catch vapor, which results in a linear water concentration profile directed perpendicular to the substrate, droplets near discontinuities can get more vapor (outer edges, corners), resulting in faster growth or less vapor (inner edges), giving lower growth. When the cooling heat flux limits growth instead of mass diffusion (substrate with low thermal conductivity, strong heat exchange with air), edges effects can be canceled. In certain cases, the growth enhancement can reach nearly 500% on edges or corners which, on an inclined substrate, make droplets near the edges detach sooner than in the middle of the substrate. This effect is frequently observed with dew condensing on windows or car windshields. Such droplets, acting as wipers, can thus appreciably increase dew collection on a substrate.

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