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Spatial distribution modeling of droplets during water dropwise condensation on textured surfaces

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SIMULATION ALGORITHM

- 1500 initial random points with size of 1μm
- Droplets growth at each time step by diffusion and coalescence
  \[ r_{\text{new}} = \left( r_{\text{old}}^2 + G \right)^{1/2}, \quad G = 4.15 \frac{K \Delta T}{H \rho} \]
- \( K \) = water thermal conductivity, \( H \) = heat of condensation and \( \rho \) = water density
- Nucleation of new bubbles in each step

RESULT

- Model validation using Ripley function (It basically evaluates the mean number of drops within a specific distance from each drop center)
- Good agreement between model and experimental results
- Deviation from Poisson process because of coalescence

PERSPECTIVE

- Investigation the effect of surface topography on droplets nucleation
- Size and shape analysis
- Other point process: Hard core process