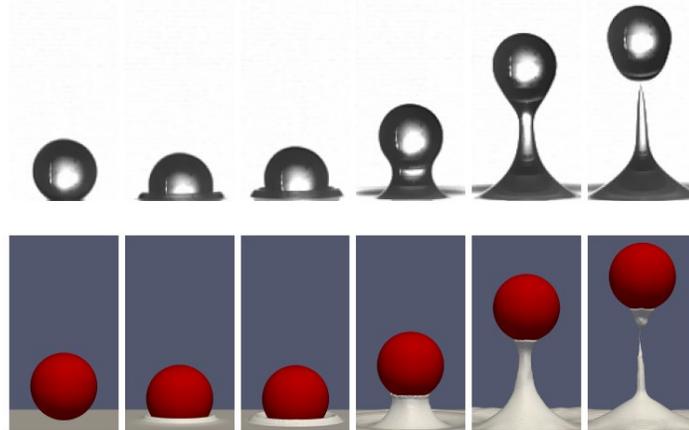


# Dense Particulate Flows with Wet Particle-Particle Interaction -Current Status and Future Challenges-

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Dense particulate flows with wet particle-particle interaction are frequently encountered in large scale industrial processes such as granulation, coating and gas phase polymerization. In these complex flows often heterogeneous flow structures are encountered driven by both (effective) fluid-particle and (strongly dissipative) particle-particle interactions. The presence of heterogeneous flow structures has a profound impact on the quality of the gas-solid contact as well as product properties and as a direct consequence thereof on the overall performance of the process. The presence of wet particle surfaces leads to considerable challenges (quantification of additional viscous dissipation in thin liquid films) with respect to detailed modeling based on first principles due to the large separation of length scales.

Due to the inherent complexity of dense particulate flows with strongly dissipative particle-particle encounters multi-scale modeling offers a powerful tool to study in detail the competition between fluid-particle and particle-particle interactions in the presence of wet surfaces. In this presentation a modeling strategy for dense particulate flows with wet particle-particle interaction will be presented. In addition, areas which need substantial further attention will be highlighted such as the extension to poly-disperse non-spherical particles and systems with coupled mass and heat transport.



*Particle impact on a flat wall covered with a thin liquid layer: (top: experiment; bottom: simulation using hybrid VOF-IBM method)*