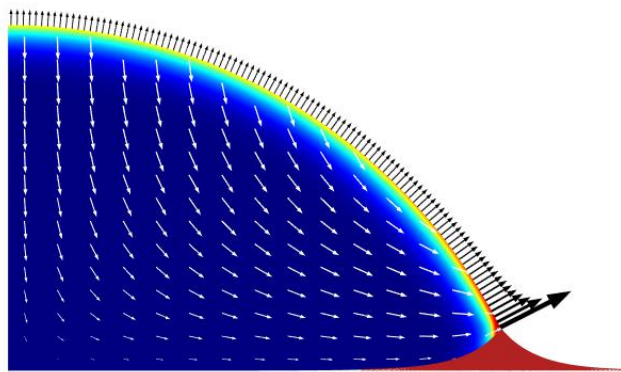# Analytical Modeling of Internal Flow during Nanoparticle-Laden Drop Evaporation

ADP, Bachelorthesis, Masterthesis
From now on
13 May 2024

Motivation

The evaporation of liquid droplets, a phenomenon ubiquitous in daily life, has garnered significant attention in scientific research. Of particular interest is the evaporation of droplets laden with nonvolatile solutes, which results in intricate deposition patterns on the substrate. Understanding the mechanisms underlying the formation of these patterns is crucial for various technical applications, spanning from coating and inkjet printing to disease detection. This work delves into the development of a comprehensive model of the specific ring-like deposition patterns observed during the drying of droplets.

Tasks

In this study we will develop analytical solution for the evaporation of nanofluids. We will validate the results with the simulation data from gained the CFD investigations. The main tasks are as follows:

1. Developing the advection-diffusion equation for nanoparticle transport during drop evaporation
2. Validation and sensitivity analysis

Requirements
- Expert in MATLAB
- Proven expertise in analytical formulation

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