

## Module PMRF-ISSS017/2026 Fundamentals of Liquid-Vapor Phase change

### Name of the PMRF student

V Venkitesh

### Details of the content of the module

### Required background of the students taught

Mechanical, chemical engineering, Basic knowledge of undergraduate fluid mechanics is recommended although not necessary

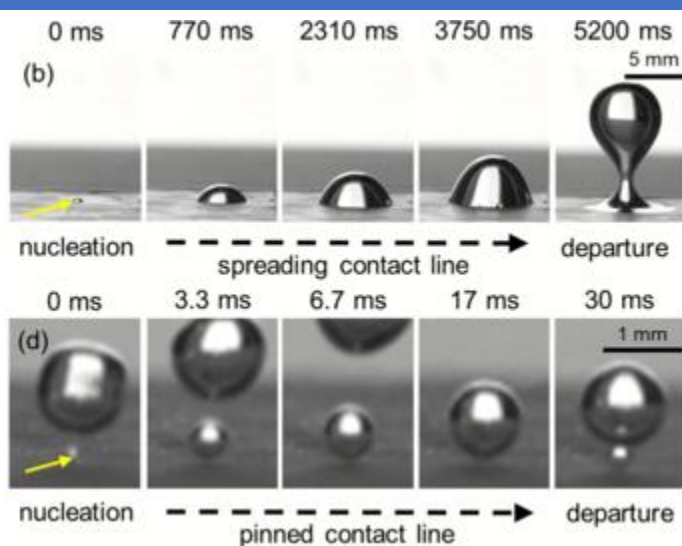
This course is an elementary course on liquid vapor phase change; pertaining to systems involving evaporation and boiling. The first part of the course will provide a synopsis of basic governing equations in fluid mechanics and heat transfer. The second part deals with introduction to phase change (phase stability, types of nucleation, and interfacial instabilities). The third part of the course is focussed on physical aspects such as pool boiling, Leidenfrost effect.

**Introduction:** Conservation equations, Wetting and contact angles.

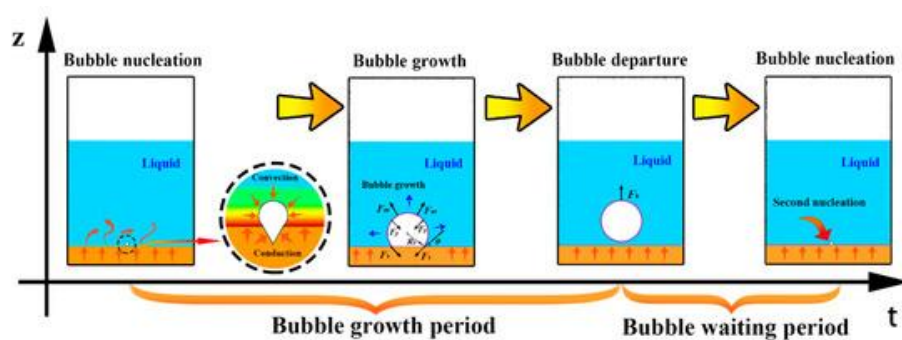
**Phase change:** Phase stability, thermal transport at interfaces.

**Nucleation:** bubble nucleation in superheated liquids, Spinodal limit, kinetic limit of superheat.

**Heterogenous nucleation:** Inertial and heat transfer dominated nucleation, pool boiling regimes: nucleate, transition and film boiling.



Bubble growth on surfaces of different wettability



Schematic of nucleation on a surface

### Schedule of the module

Start date: 17/04/2026

End date : 5/05/2026

Timings: Everyday 7-8 pm.

The lectures will be uploaded or presented live. Problem solving sessions will be scheduled in the given time after consultation with students.

Meeting link : Will be shared later

Contact email ID: [iss.forum@gmail.com](mailto:iss.forum@gmail.com)

Registration link:

