Efficient Heat Transfer Utilizing Liquid/Vapor Phase Change

(An Introduction to Science and Technology of Heat Pipes and Closed Two-Phase Thermosyphons)

Course Overview

Efficient heat transfer is of great importance in many technical areas, ranging from cryogenic cooling of IR sensors for terrestrial and space applications, to cooling of combustion engines and turbines in the automotive, aerospace and industrial/power station sectors. Various technologies are in use, with specific advantageous/disadvantageous features. Heat transfer by utilizing the latent heat of evaporation is without doubt very efficient and allows in many cases improved heating/cooling solutions.

This efficient heat transfer can be realized by Heat Pipes and Closed Two-Phase Thermosyphons. They have found wide-spread applications, ranging from microelectronics cooling in computers and satellites to large-scale waste heat recovery in industry and power stations. Their modus operandi comprises a multitude of physical phenomena like surface physics, microscale heat and mass transfer, two-phase fluid mechanics and materials compatibility. They can be designed in a variety of geometrical shapes and dimensions (from very small ball pen size tubes and thin flat plates to big drum or box type elements and very long (over 100 m) cylindrical elements.

Due to their construction and operation principle and their geometrical design, a multitude of thermal tasks can be accomplished: besides highly efficient heat transport for cooling and heating applications, also heat flux transformation, provision of isothermal spaces, thermal diode behavior and many more.

The lecture course gives an introduction into the physics and operational behavior of Heat Pipes and Closed Two-Phase Thermosyphons and provides elementary tools for analysis and design of these systems. The most important types are discussed in some detail, and a rather comprehensive overview on technical applications is given.

Dates of the course	**December 9 – 21, 2019**
Who Should Attend?	▪ B.Tech, M.Tech./M.Sc. and Ph.D. students with a basic background in thermodynamics/fluid dynamics will be able to follow and gain knowledge. ▪ B.Tech/B.Sc and M.Tech/M.Sc level teachers who wish to update their knowledge in an important special field of heat transfer. ▪ Executives, engineers and researchers from industry, service and R&D laboratories who are engaged in thermal management problems.
Fees **Modes of payment:**	The participation fees for taking the course is as follows: **Student: Rs. 2000** **Faculty: Rs. 5000** **Industry: Rs. 10000** **Research Organization: Rs. 5000** **By Online transfer:** Account No. /Name: **36401111110 /** CCE IIT Madras Bank Name and Branch: SBI, IIT Madras Branch, Chennai - 600036 IFSC Code: SBIN0001055 Swift Code: SBININBB453 Note: The participants should mention the purpose as GIAN during the transaction and have to send the transaction details to cceoffie@iitm.ac.in. **By Cheque:** Demand draft in favour of "**CCE IIT Madras**" payable at **Chennai**. The demand draft is to be sent to the course coordinator at the address given overleaf.

Accommodation	The participants may be provided with hostel accommodation, depending on availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel/
Registration Procedure	Please follow the following steps for the registration: 1. Go to GIAN website (http://www.gian.iitkgp.ac.in/GREGN/index). First time users need to register and pay a one-time fee of INR 500 / 2. Enroll for the course: Efficient Heat Transfer Utilizing Liquid/Vapor Phase Change. Once you enroll for the course, an Enrollment/Application number will be generated and the course coordinator will be notified.

The Faculty

Dr. Manfred Groll is emeritus professor of University of Stuttgart, Germany, from where he received his PhD and Habilitation degrees in 1969 and 1978, respectively. His research interests are heat pipes and two-phase thermosyphons, including micro and pulsating heat pipes; enhanced two-phase heat transfer, including micro heat transfer in pool and flow boiling; hydrogen storage, sorption heating and cooling systems employing metal hydrides; and nuclear reactor safety. He has supervised/co-supervised 76 doctoral dissertations and has contributed over 360 papers in the area of thermal engineering and energy technology.

During 1975/76 he worked for two years at NASA Ames Research Centre, Moffett Field, CA, USA on the development of heat pipe technology for satellite applications. He is Founding Member of the Committee on International Heat Pipe Conferences (1973), acted as Committee Chairman from 1990 till 2004, and since 2004 he is Honorary Chairman. In 2013 he has been awarded the prestigious George Grover Medal for outstanding contribution to the development of heat pipe science and technology.

Dr. M P Maiya received his Ph.D. degree in Mechanical Engineering from the Indian Institute of Technology (IIT) Bombay. He currently serves as professor of Department of Mechanical Engineering at IIT Madras. His areas of expertise cover sorption technology, metal hydride systems, CO_2 refrigeration, hybrid air conditioning and evaporative cooling. He has many years of teaching and research experience at the Institute and has over 175 research publications. He has undertaken many sponsored research and consultancy projects and actively associated with many professional societies such as ISHRAE, ISHMT, ISTE, SESI, ASHRAE and ASME.

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Two Weeks Course on

Efficient Heat Transfer Utilizing Liquid/Vapour Phase Change

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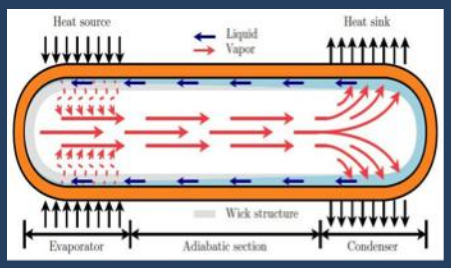

Course Co-ordinator

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