

10Th Khwarizmi International Award

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Researcher: Ghulam Murtaza

Research Title: Electron thermal transport in steep gradients

Rank: First Joint

Field: Basic Sciences

Country: Pakistan



Abstract:

The classical theory of heat conduction breaks down when temperature gradient is sharp. In such a situation which is indeed the case in laser fusion, the energy transport can be described by the proposed nonlocal thermal transport model.

Our model is based on the observation that for steep temperature gradient situations thermal transport becomes nonlocal i.e., the heat flux at any point is also influenced by the fluxes at all points in its vicinity up to a distance called the delocalization length. We solved the reduced Fokker-Planck equation using the non-diffusive approximations and incorporating various physical effects. Heat flux is estimated in the limiting cases of gentle and steep gradients.

Prof. Ghulam Murtaza is a Pakistani plasma physicist and mathematician. He was born in Amritsar, British India on January 3, 1939 where he received his elementary education. After the partition of India in 1947, Murtaza along with his family member migrated to Pakistan. In 1958, he received his BSc in Physics & Math, followed by MA in Mathematics in 1960 from the Punjab University and then in 1966 he obtained his DIC & Ph.D. in Theoretical Physics from Imperial College London and came back to Pakistan.

Dr. G. Mortaza is presently Professor of physics and the Dean, Faculty of Natural Sciences at the Quaid-i-Azam University Islamabad. He has more than 35 years of university teaching and research experience and has published one hundred and twenty one research papers in the fields of elementary particle physics and plasma physics and controlled nuclear fusion, in various international journals of repute. Dr. Mortaza pioneered the important subject of modern plasma physics and controlled thermonuclear fusion in the Pakistan and established a plasma physics group. He has also set up a plasma physics laboratory at QAU which specializes in the investigation of plasma characteristics in pinch (Focus) devices.