



School of Nano Science



IPM Condensed Matter &
Statistical Physics Group

Weekly Seminar

Investigation of Gold Nano-Particle Effects in Brachytherapy by an Electron Emitter Ophthalmic Plaque

Invited speaker:

Ms. Samaneh Hashemi

Medical Radiation Dept., Shahid Beheshti University, Tehran, Iran

Abstract:

During decades, all improvements and developments in radiation therapy technologies have been focused on its main goal: maximize the dose in the tumor and minimize it in surrounding normal tissues. Recently, scientists have some approaches to nanoparticles, especially Gold-Nanoparticles (GNPs), for dose localization. Here, the effect of GNPs in combination with electron brachytherapy in a model of eye tumor will be presented. Monte Carlo simulation was utilized and a complete anatomical model of the eye, a tumor with 5 mm thick, and a type of Ruthenium-106 beta emitter ophthalmic plaque were simulated. Simulation results have been validated by a Plexiglas eye phantom and film dosimetry, experimentally. The results showed using GNPs cause the dose amplification in 2mm from the plaque surface which the higher concentration has the higher enhancement and at more distances, Dose Enhancement Factors (DEFs) have the negative amounts, so that total delivered dose to the tumor has decreased with increasing of Au concentrations and the dose of organ at risk like sclera has increased. Therefore, using of GNPs along with a $^{106}\text{Ru}/^{106}\text{Rh}$ ocular plaque, as an electron emitter source, is a good choice only for superficial lesions and it is not recommended for deeper tumors due to the parameters of radiation treatment and delivered dose to the tissues.

Wednesday, 9 Mordad 1398 (July 31, 2019), 14:00-15:00

Seminar Room (Classroom A), Farmanieh Building, IPM