



School of Nano Science



IPM Condensed Matter &
Statistical Physics Group

Weekly Seminar

Delocalization, geometry, and optimality in purple bacterial light harvesting

Invited Speaker:

Dr. Sima Baghbanzadeh

Visiting scientist at the school of physics in IPM

Abstract:

Photosynthetic organisms harvest light using antenna complexes containing many chlorophyll molecules. Despite the wide variety of the light-harvesting complexes and very noisy environments surrounding them, the energy absorbed by these complexes is efficiently transmitted to the reaction centre. In this talk, we investigate the role of rotational symmetry within the light-harvesting complexes of purple bacteria on the efficiency of energy transfer. Our results demonstrate that breaking the symmetry of these complexes will attenuate the performance of energy transfer, due to the destruction of the coherent process of supertransfer. Specifically, in natural light conditions, as the LH1 pigments orientations are randomly changed, the performance of the natural geometry is 5.5 standard deviations better than the mean of thousands of reorientations. The magnitude of this improvement is one of the largest photosynthetic efficiency enhancement we are aware of, which has been attributed to a coherent effect.

Wednesday, 24th of Azar (1395) (December 14th, 2016), 14:00-15:00

Farmaniyeh seminar room