

SEMINAR: Protein-promoted chromophore excited state decay modulation

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15:00 to 16:00

Seminar Room

In natural photosynthesis, light energy is transferred through a dynamic protein-pigment network with remarkably high quantum efficiency. Local fluctuations in protein structure and conformational changes play a crucial role in shaping the chromophore's energy landscape for efficient light harvesting. However, the precise mechanistic role of these conformational changes remains unclear due to the complexity of natural photosystems, making them difficult to control. Photoactive biohybrids-synthetic systems that incorporate the key components of natural photosystems, such as proteins and chromophores-offer a promising approach for applying these natural principles in man-made technologies. However, designing these biohybrids presents significant challenges, particularly in controlling the protein-chromophore interaction network, which unpredictably affects the electronic and conformational states of the chromophores. In our lab, we have developed biohybrids based on optimized de novo proteins with well-defined cavities and flexible conformational states. This design enables precise tuning of the biohybrid's response through single-point mutations. Our biohybrids provide a powerful platform for studying the fundamental role of protein amino acids in chromophore relaxation, offering new insights for bio-inspired nanotechnology and photonics.

Hosted by: Prof. Dr. Nicoletta Liguori