پژوهشگاه دانشهای بنیادی (IPM)

Physics Colloquium

"سمینار عمومی علوم فیزیکی"

سخنران: دکتر ساویز صفاریان

دانشگاه هاروارد

" High resolution imaging on the plasma membrane: what does it take to go live? "

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Abstract:

Proteins come together on the plasma membrane to create large complexes with distinct biological functions including among others: endocytosis (absorbing something from outside by engulfing it with HYPERLINK "http://en.wikipedia.org/wiki/Cell_membrane" \o "Cell membrane" membrane), exocytosis (secreting HYPERLINK "http://en.wikipedia.org/wiki/Vesicle_(biology)" \o "Vesicle (biology)" something from inside HYPERLINK "http://en.wikipedia.org/wiki/Cell_membrane" \o "Cell membrane" by fusing internal vesicles with membrane), virus entry and virus exit. The protein complexes involved in these processes are in the range of 10-100 nm and have been extensively studied using electron microscopy, biochemistry and structural biology approaches. More recently the snapshot information generated using these methods have been complemented with live cell imaging of fluorescently tagged proteins. Live cell imaging provides the opportunity to obtain rates and probabilities that govern the formation of these complexes however its resolution is limited by diffraction.

In this talk I will focus on endocytosis which is driven by clathrin polymerization. Clathrin polymerizes on the plasma membrane and results in creation of a coated vesicle with the final size of ~100 nm. I will present the methodologies that we have developed including tricks that allowed us to get high resolution measurements (~10 nm) of clathrin coats in live cells. The new tools enabled us to distinguish between clathrin coats with vastly different biological functions which are indistinguishable without the dynamic data.

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