

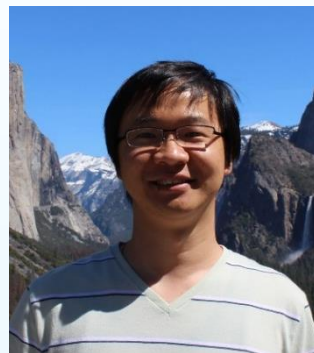
报告题目: Hidden dynamics in the unfolding of individual membrane proteins

报告人: 余昊教授

工作单位: 华中科技大学物理学院

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报告内容: Elucidating the energetics and dynamics of membrane proteins in their native lipid bilayer remains an ongoing challenge. An oversimplified view of the folding process emerges when transiently populated states are undetected because of limited instrumental resolution. This talk details how we uncover previously obscured dynamics and mysterious energetics of membrane protein folding by high resolution force spectroscopy. The technique delivered a 100-fold improvement over earlier studies. Numerous newly detected intermediate states—many separated by as few as 2-3 amino acids with occupancies $<10 \mu\text{s}$ —suggest a strikingly complex, dynamic folding network of bacteriorhodopsin. Improved free-energy landscape reconstruction at a higher resolution highlights local variations in the unfolding energy, providing a path to quantify membrane proteins energetics under native-like conditions. These results sharpen the picture of the mechanical unfolding of membrane proteins, enable experimental access to previously obscured protein dynamics.

报告人简介: 余昊, 华中科技大学物理学院教授, 博士生导师, 入选湖北省“百人计划”。2007年本科毕业于中国科学技术大学, 2013年于加拿大University of Alberta获得物理学博士学位, 2014至2017年在美国University of Colorado Boulder分校JILA研究所从事博士后研究。2017年起为华中科技大学物理学院教授。余昊教授发展了高分辨的单分子力谱技术, 将时间分辨率提高至1微秒。主要研究兴趣为发展先进的单分子力谱手段进行生物大分子动力学的实验研究, 通过力学方法研究生物分子结构转变过程, 以理解膜蛋白插入与折叠机理、蛋白错误折叠对疾病的影响、RNA折叠与功能的关系、分子机器工作原理等。目前已在Science、Nature Physics、PNAS及PRL等期刊上发表论文十余篇。