



University of Crete  
Department of Physics



**FORTH**  
INSTITUTE OF ELECTRONIC STRUCTURE AND LASER

## *Joint Dept. of Physics & IESL-FORTH Colloquium*

Friday, 12 October 2018 | 16:00 – 17:00, Seminar Room, 3rd floor, Dept. Physics

### **The 2018 Nobel Prize in Physics: From optical tweezers to strong laser fields science**

**Prof. Stelios Tzortzakis**

*Department of Materials Science and Technology, University of Crete, Greece  
Institute of Electronic Structure and Laser, FORTH, Greece  
Science Program, Texas A&M University at Qatar*

#### **ABSTRACT**

*The 2018 Nobel Prize in Physics was awarded to Arthur Ashkin, Gérard Mourou and Donna Strickland “for groundbreaking inventions in the field of laser physics”.*

*The prize recognizes two major advances in laser physics. The first one is optical tweezers and their ability to trap and manipulate small particles and especially biological molecules and micro-organisms without harming them.*

*The second one is a simple and ingenious method of laser amplification that enabled the achievement of extreme intensity laser fields. This facilitated the development of numerous advances in basic and applied science, including medical applications (e.g., eye surgery), electrons/ions acceleration, the generation of the shortest (attosecond) light probes to date, powerful radiation sources across the electromagnetic spectrum (from x-rays to THz waves).*

*In this presentation, I will be reviewing the main components and impact of these discoveries as well as presenting related research performed at the University of Crete and FORTH.*