



UNIVERSITY
OF TRENTO - Italy
Department of Physics

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2024, December 18 – 2:00 p.m., Room A208 – Polo Ferrari 1

From Smart Molecules to Adaptive Materials and Their Applications for Controlled Drug Release and Actuation

Abstract

Living systems employ dissipative processes to achieve precise spatiotemporal control over various functions, such as the transient modulation of tissue stiffness. Despite the progress, it remains challenging to develop soft materials with adaptable, time-dependent properties and to leverage these properties to develop novel applications. Success in this endeavor will lead to a new generation of soft-robotic systems and biomedical devices that can autonomously perform complex operations. This talk presents the development of novel dynamic hydrogels that exhibit spatiotemporal modulation of their mechanical properties powered by electricity and light. Temporally controlled operations of these hydrogels are demonstrated for on-demand, dose-controlled release of multiple model drugs and transient actuation for soft robotic applications.

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