



SEMINAR

Young Researchers in Mechanical Engineering



Nonlinear Dynamics of Two-Dimensional Nanoresonators

SPEAKER

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ABSTRACT

Micro and nanomechanical resonators are essential to the state-of-the-art communication, data processing, timekeeping, and sensing systems. The discovery of graphene and other two-dimensional (2D) materials has been a profound source of inspiration for the next generation of these devices, owing to their exceptional mechanical, electrical, and thermal properties. However, alongside their advantages, the atomically thin nature of these resonators also presents its own unique challenges, as the dynamic response of these resonators rapidly becomes nonlinear, where nonlinear coupling and dissipation processes manifest. In this talk, I will delve into the realm of nonlinear dynamical phenomena within 2D nanoresonators, exploring the intermodal coupling between their mechanical motion and microscopic physics. Furthermore, I will discuss the potential directions to harness these phenomena for various applications towards nano/micro-mechanical sensing.

ABOUT THE SPEAKER

Ata Keşkekler earned his B.S. degree in Mechatronics Engineering from Sabanci University, Istanbul, in 2016, followed by his MSc. degree in Mechanical Engineering from TU Delft in 2018. He completed his Ph.D. research on "Nonlinear Coupling and Dissipation in Two-Dimensional Resonators" at TU Delft in 2023. Currently, he serves as a postdoctoral researcher at TU Delft, focusing on the nonlinear dynamics of micro/nanomechanical systems. His current research involves the development of photonic crystal lightsails for laser propulsion in spacecraft applications.



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