סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ה' 31.03.22
(כ"ח אדר ב, תשפ"ב), בשעה 13:30 באמצעות הזום : https://technion.zoom.us/j/95361383579

מרצה : Subhani Shaik

מנחים : Assoc. Prof. René van Hout

על הנושא:

Kinematics of rigid fibers in a turbulent channel flow

The seminar will be given in English

תקציר ההרצאה :

Fiber turbulence interactions occur in the production of paper, the fabrication of composite materials, prediction of atmospheric particle dispersion, as well as in micro-plastic dispersion in the ocean. In many of these cases, fibers are present in the vicinity of boundaries where turbulence length and time scales strongly change. The two main parameters governing the response of a fiber to changes in the surrounding flow, are its shape and inertia. This research was, focused on how changing the length and inertia of rigid, straight fibers affects their kinematics in a turbulent boundary layer. Experiments were performed using two-orthogonal view, digital inline Fraunhofer holographic cinematography that allowed time-resolved, 3D tracking of individual fiber positions and orientations. Seven different types of nylon and polyester fibers were studied. In order to differentiate between length and inertial effects, fibers were grouped into those having similar lengths but different inertia and those having similar inertia but different lengths.

The present results show that wall-normal distributions of fiber concentrations, translational velocities, orientations, and rotation rates exhibit a strong and coupled dependence on both fiber length and inertia. Close to the wall, fibers move faster than the fluid as a result of their preferential segregation in high-speed flow regions. Fibers preferentially align in the streamwise direction which is more profound in the near-wall region thereby limiting fiber-wall interactions. Close to the wall, fibers exhibit higher rotation rates, and coupled fiber length and inertial effects were observed. The present experiments are the first, detailed and statistically relevant 3D measurements of fiber kinematics in wall-bounded turbulence.

בברכה,

פרופ"ח אתי סאס

מרכז הסמינרים