



הפקולטה להנדסת מכונות

הטכניון – מכון טכנולוגי לישראל

סמינריון

הנך מוזמנת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ה' 10.11.16 (ט' בחשוון, תשע"ז), בבניין דן-קאהן, קומה 0, אודיטוריום 1, 14:30.

ירצה: אלכסנדר יופה

מנחה: פרופ' ח דורון שילה

על הנושא:

The magneto-mechanical response of magnetostrictive composites for stress sensing applications

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

Magnetostrictive composites are of considerable interest for real-time remote force sensing and structural health monitoring. Load sensing based on magnetostrictive composites offer two unique advantages over other sensing methods. First, the magnetic field sensor can be mounted remotely from the magnetostrictive material and second, a variety of miniature and complicated sensor shapes can be easily formed.

We introduce a new procedure for modeling the magnetic field induced by an external load applied on a magnetostrictive composite material. This model is based on an assumed sequence of physical processes that occur at the microscopic scale, and it includes both domain switching and magnetization rotation. The modeling procedure is demonstrated on a problem relevant for load sensing applications in which the magnetostrictive composite is subjected to a uniaxial compression.

Further, we investigated the relationships between the stress, strain, and magnetic field emitted from epoxy-based Terfenol-D composite materials. Several key factors that are crucial to the performance of stress sensors were studied, including the reversibility, hysteresis, strain rate effects and strain amplitude effects. The experimental results were compared with simulations based on the physically based model that accounts for the inherent hysteretic and non-linear mechanical behavior of the epoxy. In addition, the magneto-mechanical behavior at different temperatures was examined. Finally, a novel hybrid composite that combines particles of soft and hard ferromagnetic materials was produced and demonstrated significantly stronger magnetic signal and larger operating range.

בברכה,

פרופ' ח דורון שילה

מרכז הסמינרים