



Solid State Institute  
המכון למצב מוצק

TECHNION  
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of Technology



הטכניון  
מכון טכנולוגי  
לישראל

## SPECIAL SEMINAR

סמינר מיוחד

# Laser Physics and Spectroscopy in Alkali Vapor-Noble Gas Mixtures; Dynamics of Quantum Superposition States Examined by High- Resolution Quantum Beat Spectroscopy

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### Abstract

We demonstrate that excited alkali states can be spin-polarized with circularly-polarized optical fields, by means of a transient alkali-rare gas molecular complex. Circularly-polarized alkali D2 line lasers have also been realized, and the ability of the pump optical field ellipticity to control the effective degeneracy of the upper laser level is tantamount to controlling the laser transition gain coefficient.

Quantum beating at frequencies up to 73 THz has been observed, and coupled quantum beating has been detected by Parametric Four Wave Mixing (PWF) when Rb vapor is excited with pairs of 55 fs pulses. Tailoring of the laser spectrum results in  $7s-5d5/2$  and  $8s-6d5/2$  quantum beating at 18.225 THz and 10.73 THz, respectively. The interaction between the two state superpositions is observed in both the time and Fourier (frequency) domains.

ההרצאה תתקיים ביום שני, ה- **23.4.18**, בשעה 12:30  
באודיטוריום המכון למצב מוצק, קומת כניסה

The lecture will take place on Monday, **23.4.18** at 12:30  
at the Solid State Institute auditorium, entrance floor

Host: Professor Gadi Eisenstein