



**אוריאל לוי**  
**האוניברסיטה העברית**  
**המעבדה לננופוטוניקה**

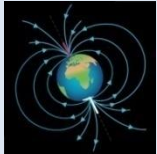
**שילוב אטומים חמים ורכיבים אלקטרו-אופטיים בעזרת**  
**טכנולוגיה ממוזערת על שבב**

# Integration of nanophotonics and atomic physics



## HOT VAPORS

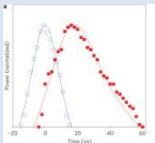
Frequency references



Magnetometers



Few photon switching



Slow and Fast light

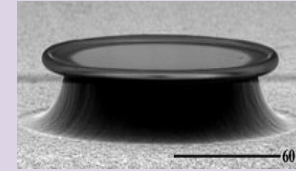
$$\frac{1}{\sqrt{2}}|\uparrow\rangle + \frac{1}{\sqrt{2}}|\downarrow\rangle$$

Quantum computation

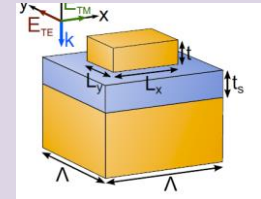


Lasers

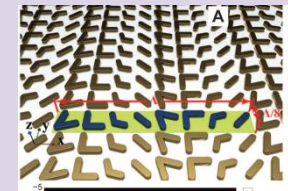
## NANOPHOTONICS



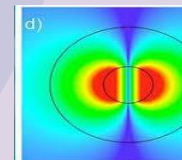
High Q cavities



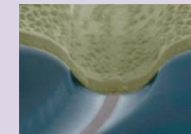
Metamaterials



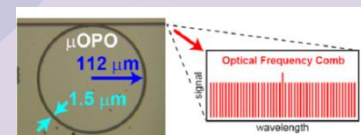
Nanoantennas



Spasers

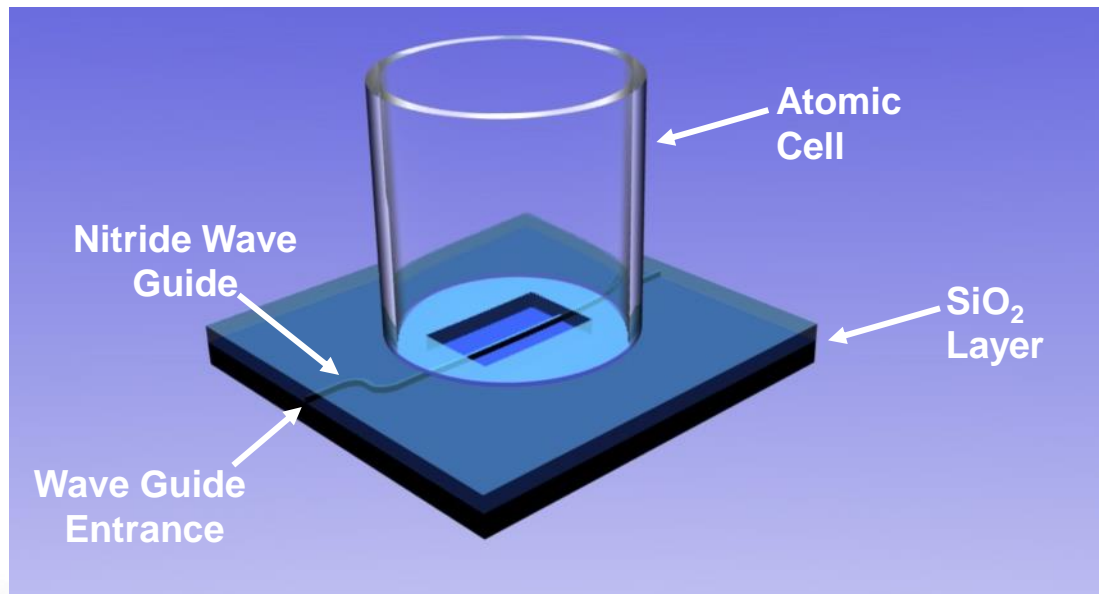
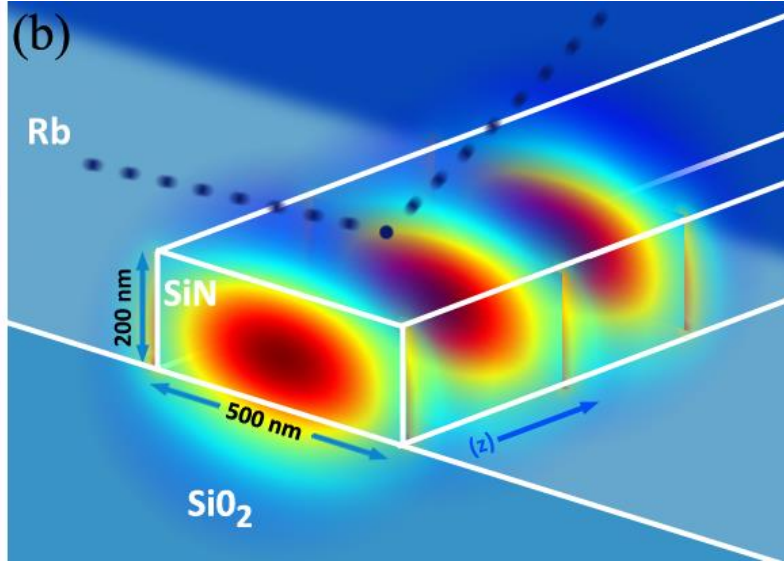
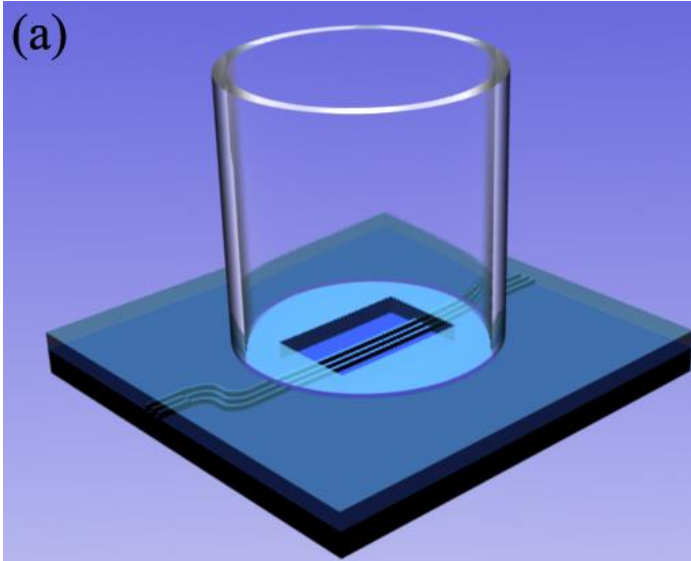


Light detection



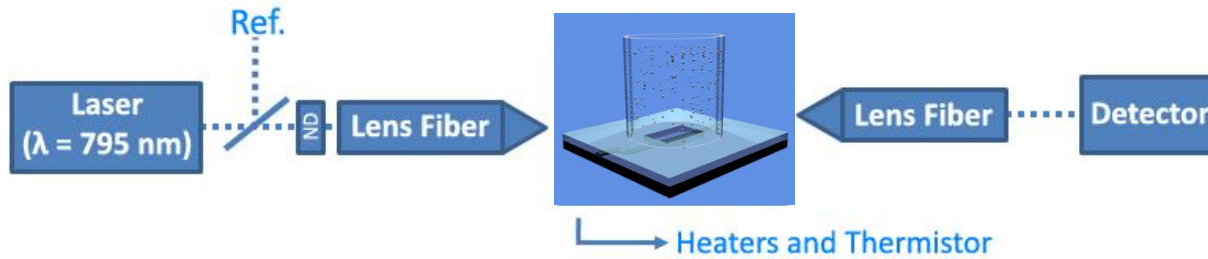
Frequency comb

Light-Vapor interactions at the nanoscale

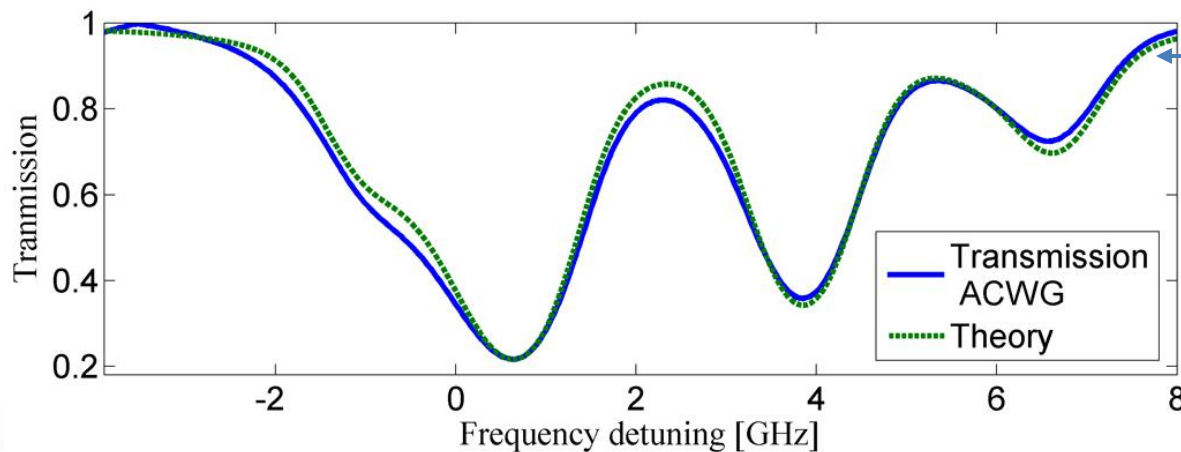
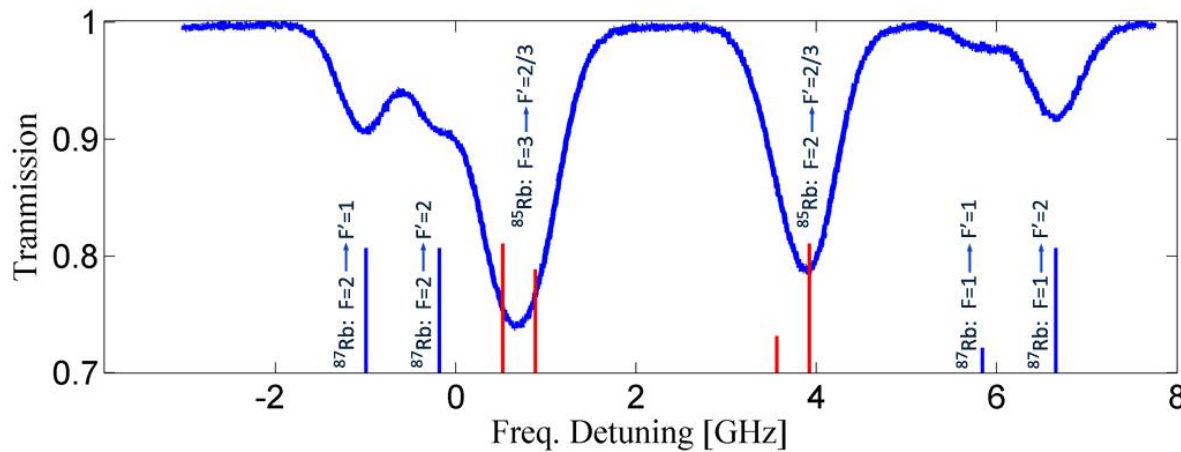




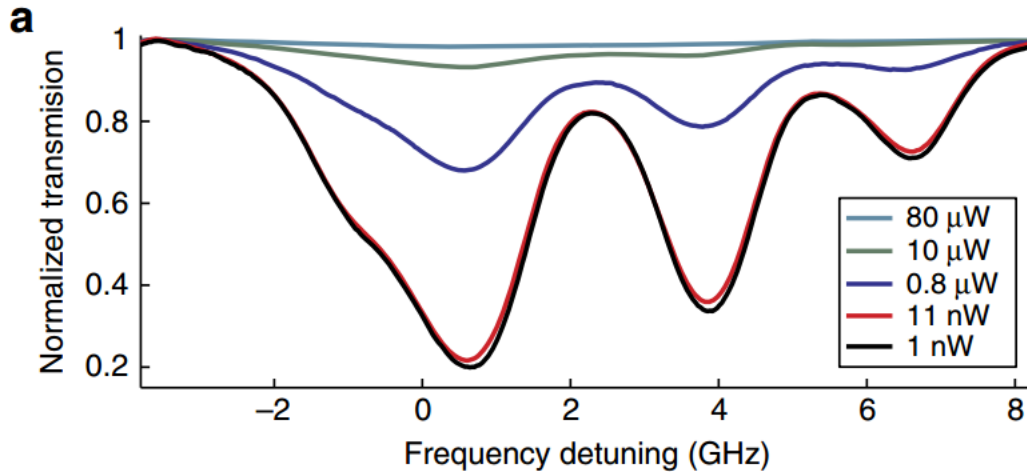
## Setup:



## Results



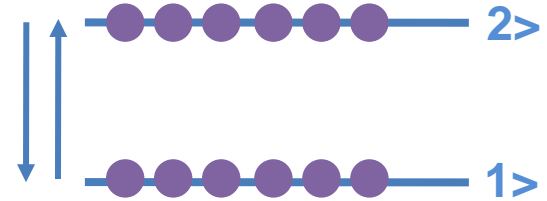
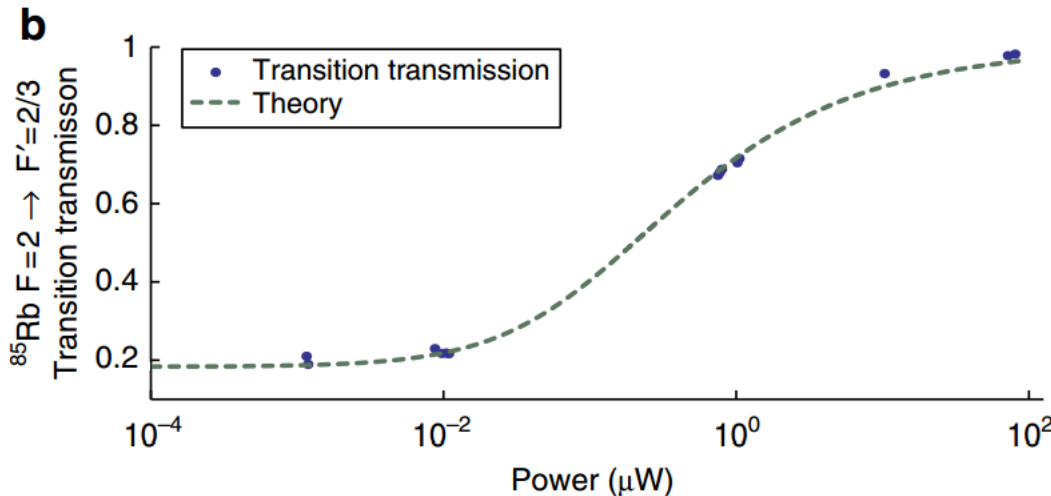
Theory curve is Based on Attenuated Total Internal reflection Susceptibility



The transmission is a non linear function of the intensity:

$$T(\omega) = I_0 \cdot e^{\alpha(\omega, I_0)L}$$

Physically, this is due to the fact that at equal population there is no absorption:



We estimate the saturation to be at the regime of nW!



**תרומה למאגד: פיתוח פלטפורמה אינטגרטיבית על  
שבב המשלבת רכיבים ננופוטונים ואטומים חמים למגוון  
ישומים – יתרונות: מזעור, הקטנת הספק, יצוריות ועוד.  
מה נרצה לקבל מהמאגד – שילוב באפליקציות,  
אינטגרציה עם סכמות קוונטיות מתקדמות, יכולות אפיון  
ותשתיות משלימות.**