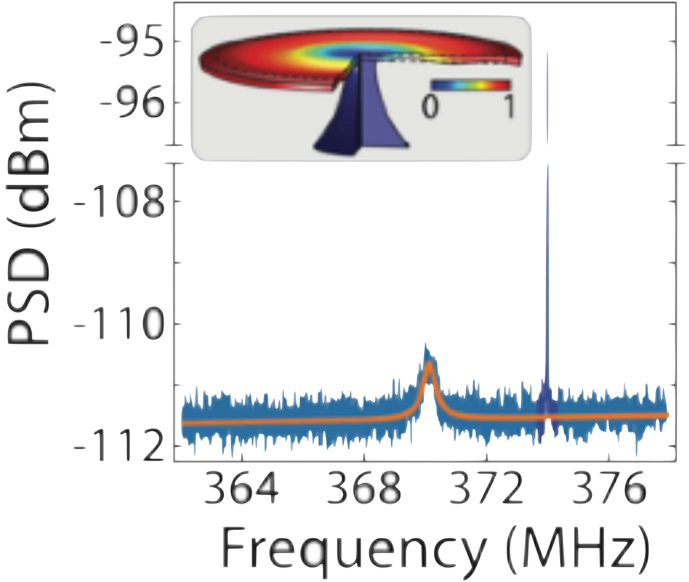
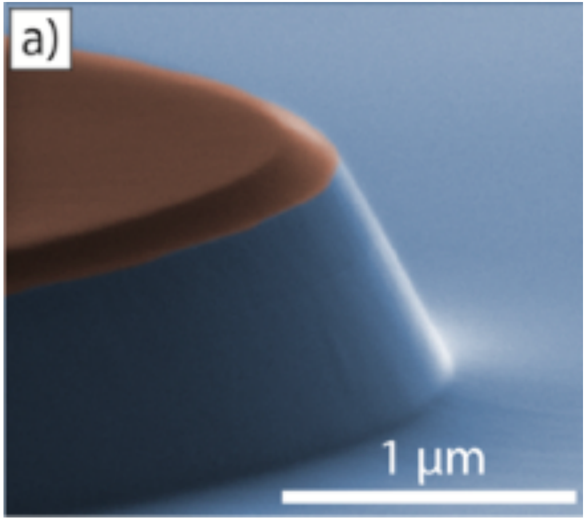
Optomechanical possibilities

Conclusions & Outlook

101

GaAs Optomechanics



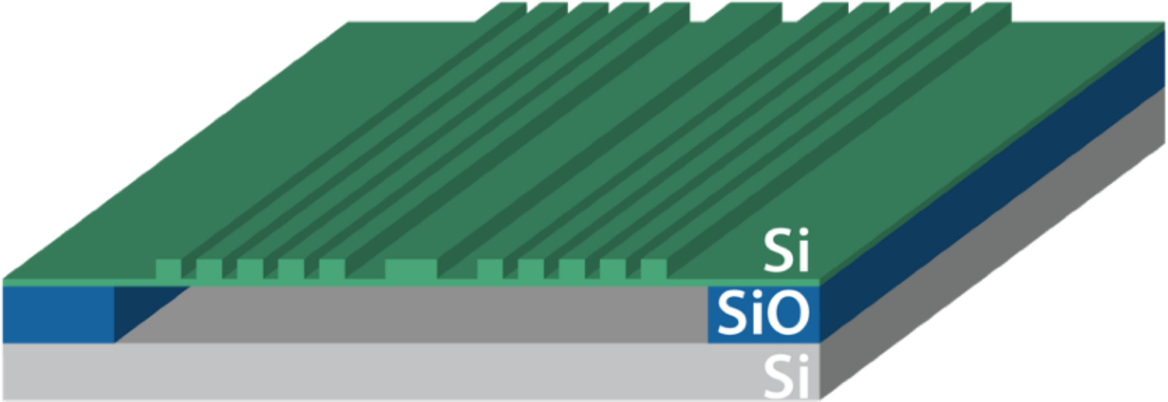


Opt. Mat. Express, **10**, 57 (2020)

converter

Optomechanical mode

Jarschel et al, APL Photonics 6, 036108 (2021)


Si
SiO
Si

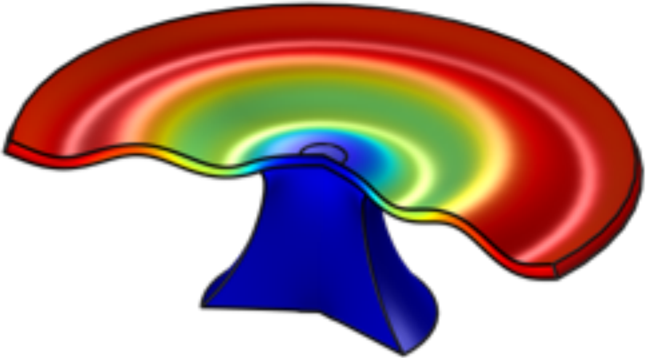
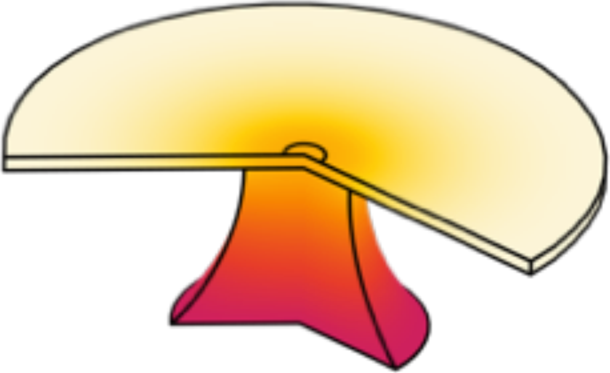


Photo-Thermal

Forces

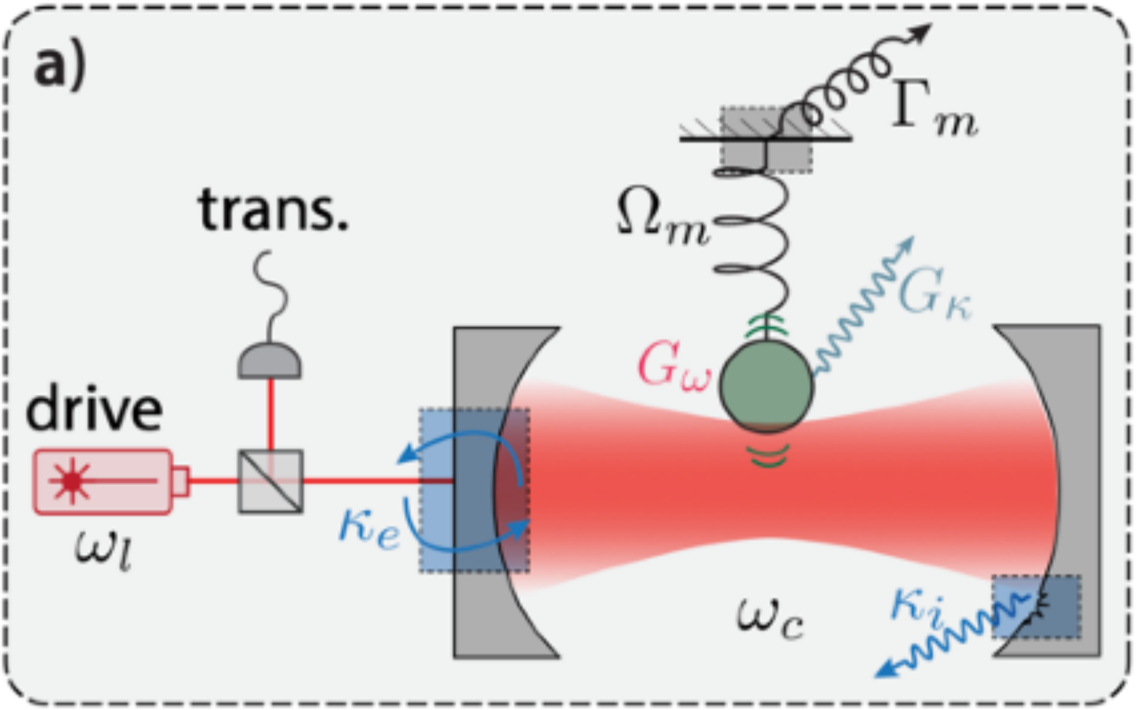


$$\left|\vec{u}\right|$$

$$S^{\theta} = \boldsymbol{\alpha}\delta T(\vec{r}, t)$$

δT

APL Photonics **6** (8), 086101

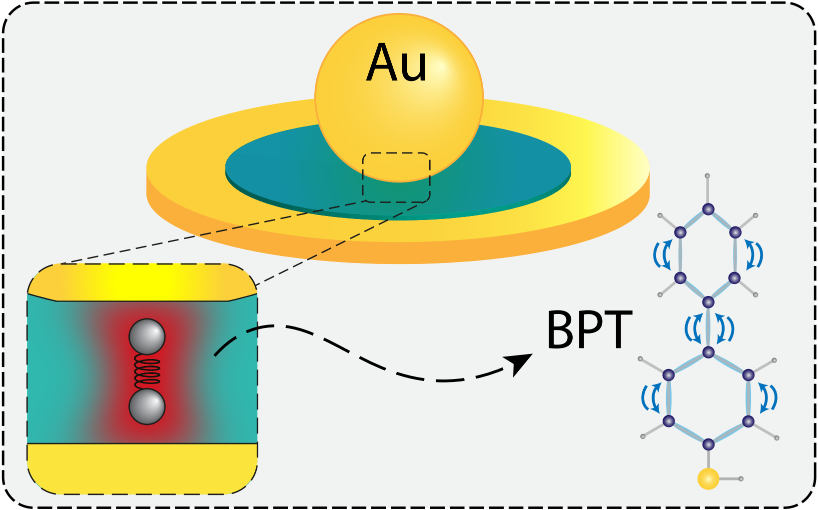


a)
trans.
drive
ω_l
κ_e
Ω_m
Γ_m
G_κ
G_ω
ω_c
κ_i

Optics express **29**, 1736-1748 (2021)

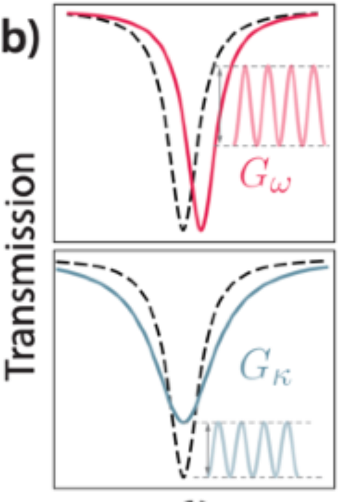
Strong Confined

Brillouin



Au
BPT

PRL **125**, 233601 (2020)



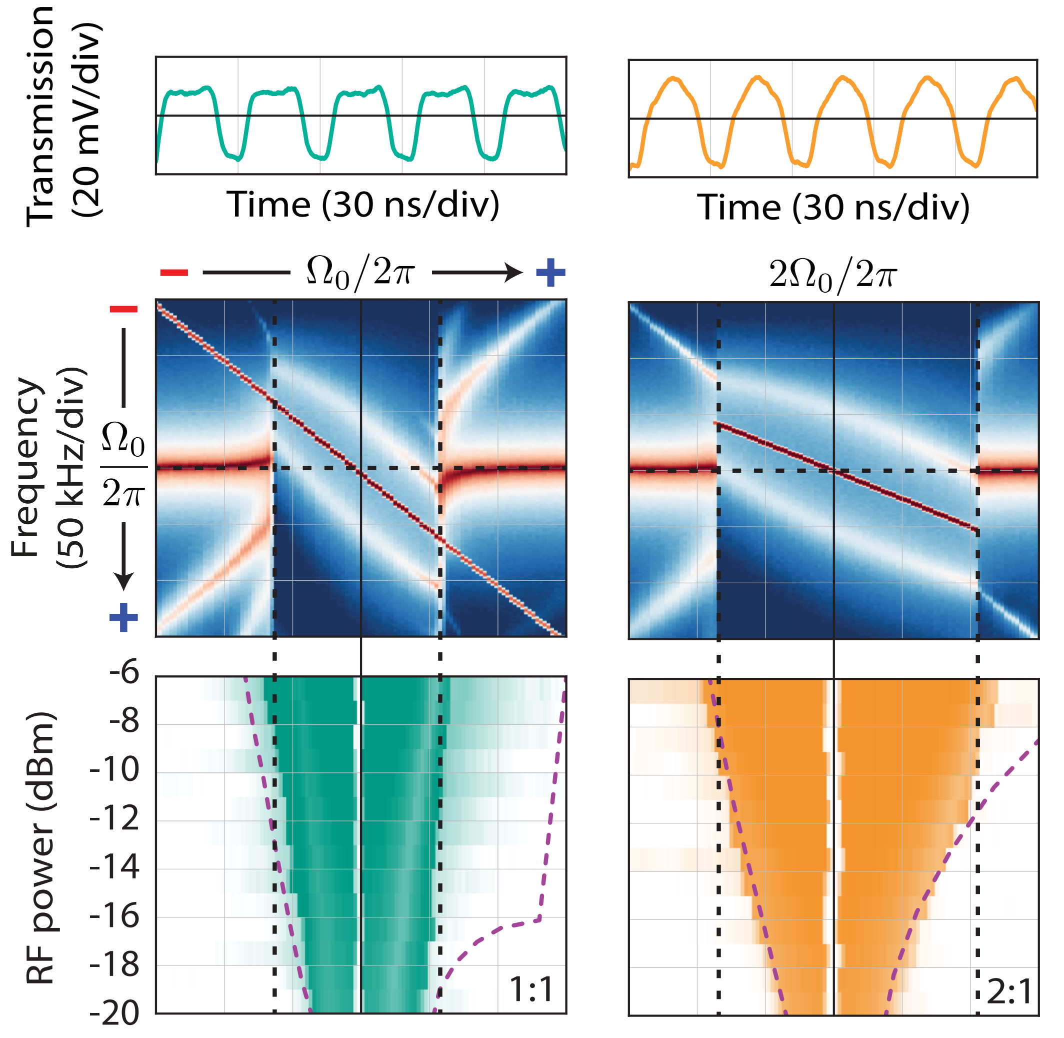
b)
Transmission
G_ω
G_κ

Quasinormal-modes

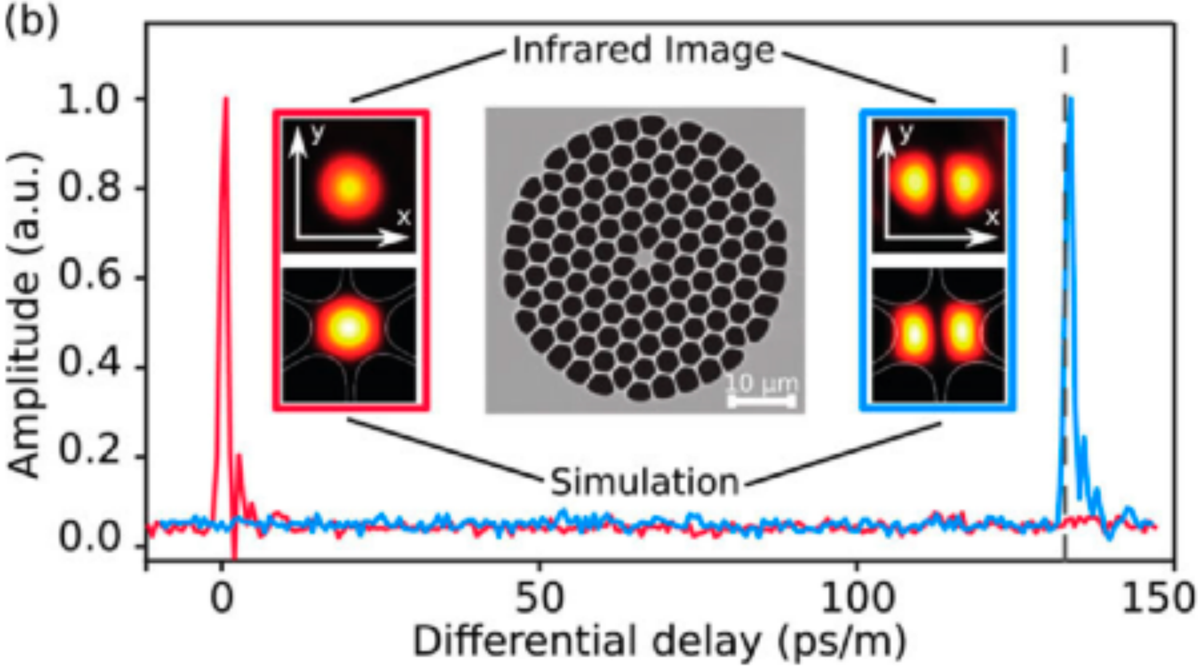
Nat Commun **12**, 5625 (2021).

Optomechanical

synchronization

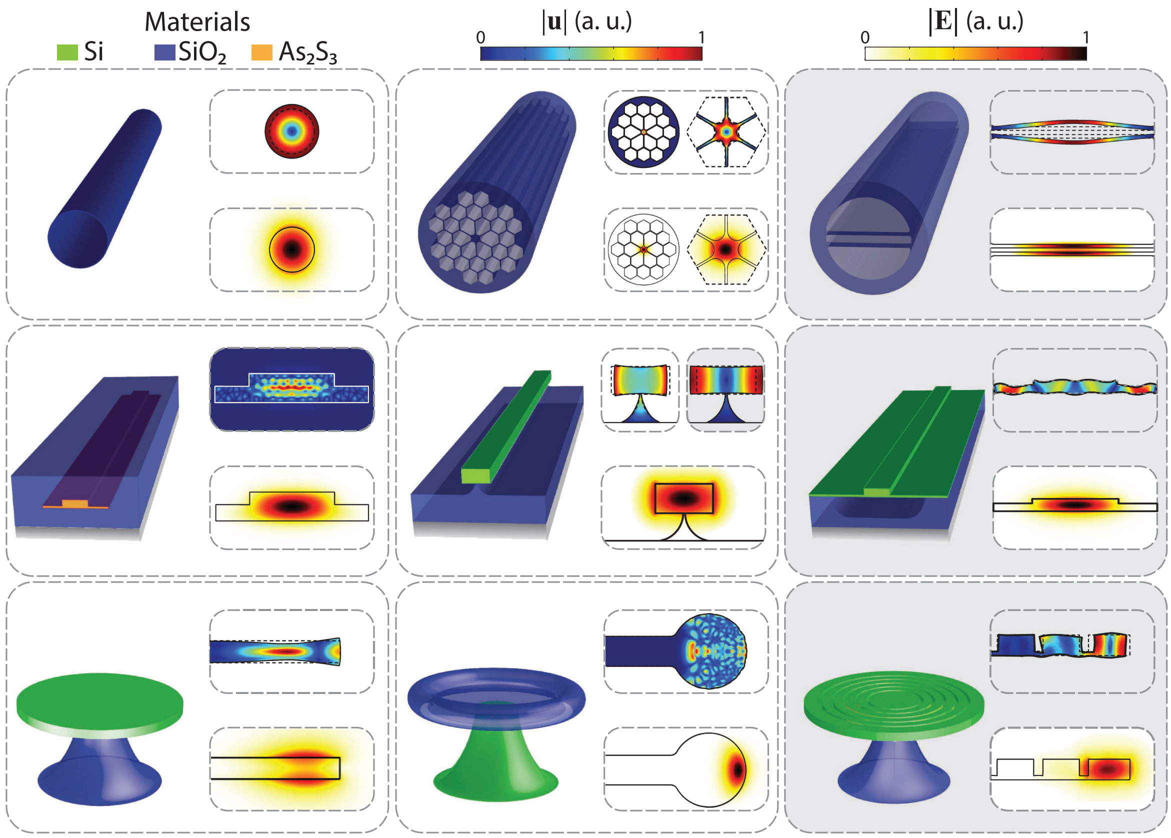


Transmission (20 mV/div)
Time (30 ns/div)
Time (30 ns/div)
$\Omega_0/2\pi$
$2\Omega_0/2\pi$
Frequency (50 kHz/div)
$\frac{\Omega_0}{2\pi}$
RF power (dBm)
-6
-8
-10
-12
-14
-16
-18
-20
1:1
2:1


(b)
Infrared Image
Simulation
10 µm
y
x
Amplitude (a.u.)
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
Differential delay (ps/m)

scitation.org/journal/app

APL Photonics



Volume 4, Issue 7, Jul. 2019

Brillouin optomechanics in nanophotonic structures

APL Photon. **4,** 071101 (2019); doi.org/10.1063/1.5088169

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AIP Publishing

Thiago Alegre

Paulo Dainese

APL Photonics **4**, 071101 (2019)

- Bridge radio and optical frequencies

information (including quantum)

- Interface with molecular vibration

- OM cavities and waveguides based on active materials

- Nonlinear optical interactions to write and read

- Fundamental and technological challenges