Trapping sound with light

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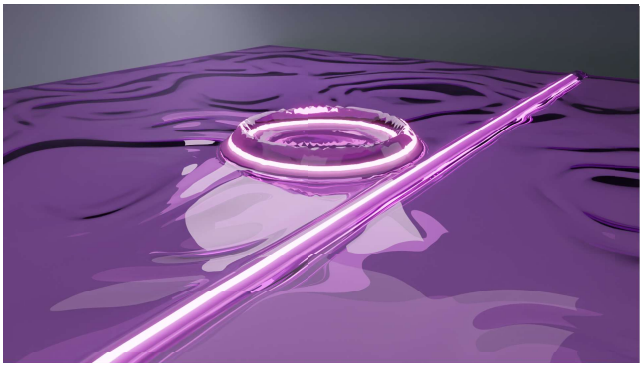
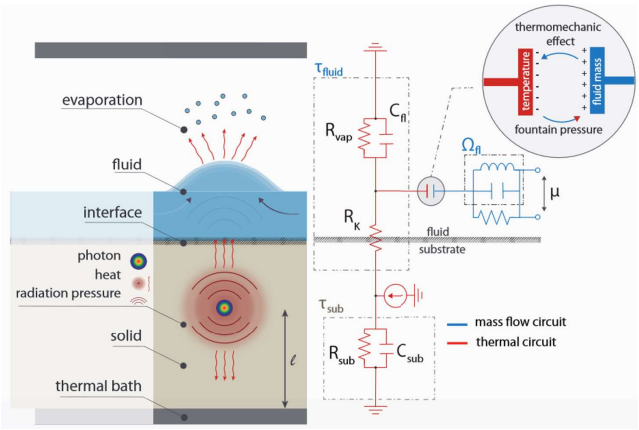
Can light be used to maipulate and control fluids?



How light interacts with superfluid

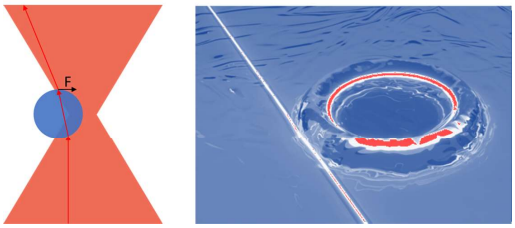
Light in a resonator that is coated with a thin film of superfluid can deform the film through two key mechanisms:

- Radiation Pressure.
- Photothermal effects.



How does light trap?

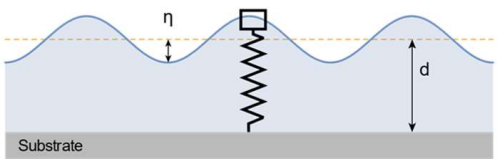
Light refracts though transparent media, if that media is compliant it will be drawn into the high field intensity of the light to conserve momentum.



Superfluid acoustics

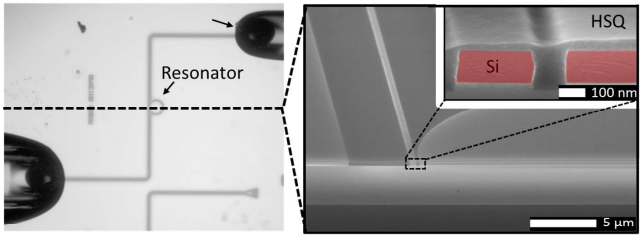
The speed of sound in superfluids is strongly dependant on the thickness of the film.

$$c_3 = \sqrt{3\frac{\rho_s}{\rho}\frac{\alpha_{vdw}}{d^3}}$$

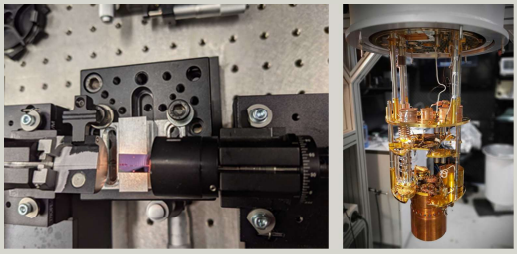


An optical trap for superfluid

We have designed and fabricated devices that have no boundary conditions on the surface using spin on glass, to create acoustic modes using only light.



How we set up the experiment



References

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Want to know more?

For more information on superfluid optomechanics visit christophergbaker.com and for more work from our lab visit qo.lab.uq.edu.au

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