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## In brief: Liquid lensing

Optical microlenses are vital for focusing and directing light signals in modern optical telecommunications systems, so being able to alter the lenses' properties dynamically could be extremely useful. A recent study uses a liquid microdroplet as just such a microlens whose focus and position can be tuned electronically.

### Tunable liquid microlens

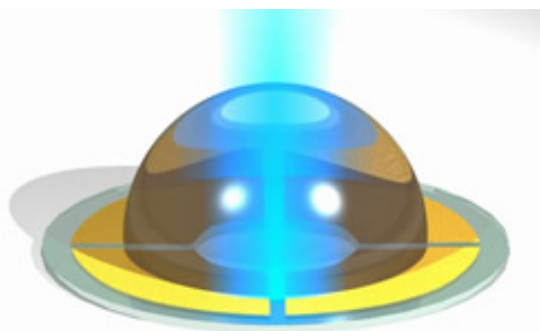
T. KRUPENKIN, S. YANG & P. MACH

A tunable liquid microlens capable of adjusting its focal length and lateral position is demonstrated. The microlens consists of a droplet of a transparent conductive liquid placed on a dielectric substrate with a low surface energy coating. By varying the voltage applied to a set of electrodes positioned underneath of the dielectric substrate, both the position and curvature of the microlens can be reversibly changed. The dependence of the microlens behavior on the properties of the materials involved is experimentally investigated and supported by theoretical calculations. Potential limitations of the microlens performance associated with the contact angle hysteresis and stick-slip phenomena are outlined and possible ways to alleviate them are proposed. Possible extensions of the proposed approach are also discussed.

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