Controlling optical binding creates trap for optical matter

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Optical binding forces can be precisely controlled to realize a trap for self-organized optical matter, MIT researchers will report in an upcoming issue of *Physical Review Letters*.

Optical binding forces, reported in 1989 by Burns et al., manifest themselves as soon as multiple particles interact in an electromagnetic field. So far, these forces have been experimentally verified but they have never been actively controlled to achieve desired properties.

"Our paper shows for the first time a precise control of these forces," said Tomasz M. Grzegorczyk, a research scientist in MIT's Research Laboratory of Electronics. This is illustrated "by balancing the radiation pressure from a laser light, a work pioneered by Ashkin in the 1970s-1980s, to realize an optical trap.

"Such control can be used to create reconfigurable field and force distributions with customizable properties in space and time, which have important applications in biology for the manipulation of small living organisms and in astronomy for the design of a giant space laser trapped mirror as postulated by Labeyrie in 1979."

Source: MIT