Bend breakthrough sends light around a corner

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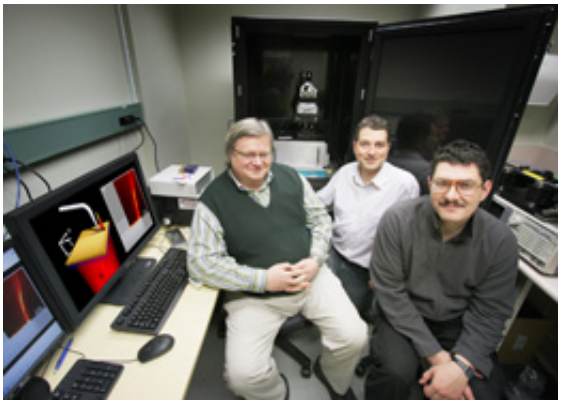

Credit: Tim Wetherell.

(PhysOrg.com) -- Australian National University scientists have successfully bent light beams around an object on a two dimensional metal surface, opening the door to faster and cheaper computer chips working with light.

The international team, including three members from the Research School of Physics and Engineering at ANU, have successfully demonstrated that a tiny beam of light on a flat surface can be bent around an obstacle, and course-correct itself on the other side of that obstacle. It's the world's first two-dimensional demonstration of so-called 'Airy beams'. Their paper on the subject will be published in this month's *Physical Review Letters*.

“Students in science class learn that light rays travel along straight trajectories and that it can’t go around corners,” said ANU team member Professor Yuri Kivshar.

“Recently it was discovered that small beams of light can be bent in a laboratory setting, diffracting much less than a regular beam. These rays of light are called ‘Airy Beams,’ and named after the English astronomer Sir George Biddell Airy, who studied light in rainbows.

“Our team has demonstrated that these beams can also be bound on the flat surface of a chip. We also observed a fascinating property of these beams – the so-called self-healing phenomenon, where the wave recovers after passing through surface defects,” he said.

Fellow ANU team member Dr. Dragomir Neshev says that this demonstration offers potential in a number of areas.

“This discovery offers some exciting possible applications, particularly in the area of communications technology where it could allow us a cheap way to manipulate light on a chip,” he said.

“It also offers potential in the manipulation of biological molecules in a much cheaper way than it is currently done.”

The demonstration that light can be made to bend on a flat surface has been the subject of fierce academic competition by research groups around the world, including groups from the USA, China, and Korea.

Provided by Australian National University