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**NEWS**

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# Incoherent boost for light surgery

**A group of Israeli researchers have shown how to carry out surgery using a non-coherent light source. The device could provide a cheaper and safer alternative to conventional laser surgery (*Appl. Phys. Lett.* 88 114104).**

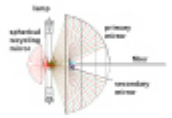

Figure 1

Laser light can be used to perform a number of medical procedures, such as removing cancerous tissue. The beam is fed into an optical fibre and through a catheter, heating the millimetre- or centimetre-sized growths to death. However, the technique is expensive and therefore not that widely used.

In 2002, Jeffrey Gordon and colleagues at the Ben-Gurion University of the Negev in Israel developed an alternative to laser surgery that focused ordinary sunlight into a narrow optical fibre using a parabolic mirror. The device can provide the same power and flux levels as lasers but solar surgery is of limited practical value because some countries are sunnier than others.

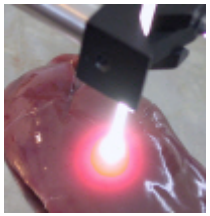

Figure 2

The team has now achieved similar results using light from commercially available short-arc discharge lamps -- a system that does not rely on the presence of sunlight. The set-up uses two mirrors to concentrate the light and a third to "recycle" light emissions. This is because half the light emissions go into the hemisphere away from the concentrator. The hemispherical recycling mirror captures 50% of otherwise lost lamp emission and focuses it so that light throughput can be enhanced for an optical fibre of the same diameter (figure 1).

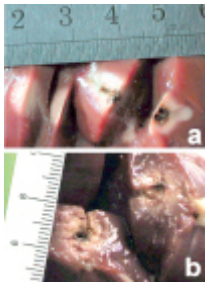

Figure 3

The device has a number of advantages over lasers -- one is that its output contains visible wavelengths, which can penetrate more deeply into tissue than the infrared or ultraviolet radiation from lasers. Another bonus is cost: Gordon says that the system can destroy as much tissue per unit of energy as a laser, but is at least ten times cheaper. The device is also safer than conventional laser systems because the light can be seen, in contrast to lasers that operate outside visible wavelengths.

The team has used its new device to carry out surgery on *ex-vivo* chicken livers and kidneys (figures 2 & 3) and has also begun clinical trials on live animals. "The trials have so far yielded excellent preliminary indications and will be followed by trials on animals with cancer," says Gordon.

## About the author

Belle Dumé is science writer at *PhysicsWeb*