Editorial

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New cancer cure with bubble lasers

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Editorial

In the March issue of Physics Today, 2024, an article was published on p. 12 : “Bubble Lasers Can Be Sturdy and Sensitive”.[1] The post-graduate student Korenjak and her adviser Humar from the Josef Stefan Institute in Ljubljana, Slovenia, found that ordinary soap bubbles are a pretty good laser because each bubble is a resonator.[2] Being soft and filled with air, the bubbles are very sensitive to their environment, which makes the laser light of bubbles to vary in wave frequencies and intensity in the ways most conventional lasers don’t.

However, since the soap bubbles are prone to bursting, Korenjak and Humar switched to using smectic bubbles made of smectic liquid crystals, which were stable and with uniform thickness. They dissolved a few specks of laser dye in the soap solution and then shined a pumped laser on the resulting bubbles. Pumped dye lasers are a common setup in laboratory experiments that require wavelength tunable output. What is happening is: the fixed-wavelength pump laser excites the dye molecules, which then emit light at a longer wavelength.[1,2]

When a dye molecule emits a photon into a resonant laser cavity, it stimulates other molecules from the bubble to emit more and more matching photons and the result is laser light. Dye molecules can emit light across a wide range of wavelengths[2] and the soap bubble spectrum is erratic and hard to interpret. The light interferes with itself as it bounces from the bubble’s inner and outer surfaces. The interference can be described as a thickness dependent effective refractive index, which affects how many wavelengths fit around the circumference of the bubble.[1,2]

Since the soap bubble thickness is always changing, this creates a complicated dynamic laser spectrum – and this is what is needed for cancer treatment. As I showed in my article,[3] Russian studies found that: 1/ cancer cells emit in the infrared (IR) and 2/ cancerous tissue have crystal formations like “stacked coins” in the space between the cells, which don’t allow the cells to communicate.[3] The disconnected cells, like the cells in a cut wound, start to multiply fast, to heal the would fast. But while in the cut wound the cells are governed by the current of regrowth where to go, in the cancerous tissue the cells multiply senselessly, which is called malignancy.

Since it was found that IR lasers with nonlinear beams can destroy crystals, I offered in my article[3] to use such IR lasers to destroy the crystal formations in the extracellular space, which would restore the communications between the cells, and cure or prevent the cancer. In this article, I am suggesting to use bubble lasers for cure and prevention of cancer because if the dye molecules can emit light across a wide range of wavelengths,[2] bubbles with appropriate dissolved laser dye should be able to create IR laser light, as well.

A very important factor is the fact that the soap bubble spectrum is also nonlinear because the light interferes with itself as it bounces from the bubble’s inner and outer surfaces, which is described as a thickness dependent effective refractive index.[1,2] Therefore, nonlinear laser beams in the IR could be used to destroy the “stacked-coins” formations in the extracellular space of cancerous tissue, which will restore the normal communication between the cells and cure or prevent the cancer.

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Conflicts of interest

The author declares that there are no conflicts of interest.

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