Physicist Toshiki Tajima is trying to sweep away coronavirus

Using nanoscale fibers, Tajima's designing a "nanobroom" that may one day turn into a treatment for COVID-19 patients.
Tuesday, June 23, 2020
Lucas Joel
Medium



Toshiki Tajima, a physicist in the Department of Physics & Astronomy.

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Optical Society of America

Toshiki "Toshi" Tajima is a physicist in the Department of Physics & Astronomy, and he's one of our faculty who, over the last few months, retooled his scientific skillset to help stem the still-encroaching tide of the coronavirus pandemic. Recently, Tajima, along with a team of researchers from across campus and around the world, formulated an idea that they call a "nanobroom" — a devise made of carbon nanotubes that surgeons might one day insert into the lungs of a COVID-19 patient and kill coronavirus particles by showering them with electrons emitted through the tubes.

“The trick was to identify how to access coronavirus, number one,” Tajima said. “Number two: how to kill coronavirus? What are the coronavirus’ weaknesses?” Some weaknesses, Tajima explained, appear to be X-rays and ultraviolet light. “DNA of the coronavirus may be mutated by the electrons which are generated by X-ray and UV, and electrons destroy the DNA structure,” he said.

Tajima uses lasers in his research, and a close call with cancer in the 1990s moved him to imagine ways his research could acquire a medical bend. His team’s plan with the nanobroom — which, microscopic in scale, can reach the intricate corners of the lungs where coronavirus might be — is to directly inject electrons into a patient’s lungs.

If it works, it’ll be unlike any treatment that currently exists.

“This is the first ever,” said Tajima.

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