New technology enables the detection of microplastics from road wear

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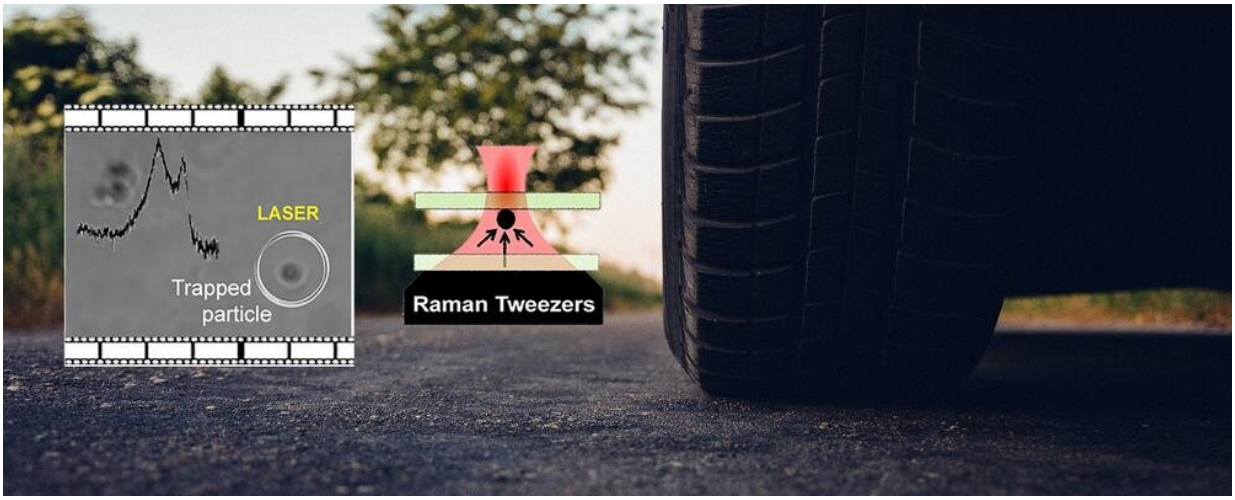

Credit: University of Gothenburg

A new study shows that a form of optical tweezers can be used to detect small microplastics from tires and road wear, that previously has been too small to detect. The results can be used to develop more sustainable tires that produce less pollution.

Tire and road wear particles are very small microplastics generated by road transport means during the mechanical abrasion of tires, brakes, and roads. The particles are accumulated on the roadsides and then run off into watercourses where they pollute the water ecosystem. Whilst the

amount of pollution from larger microplastics is known, there has been a technological gap in the detection and analysis of the fraction of these smaller particles.

In the study, by using a combination of optical tweezers and Raman spectroscopy called Raman tweezers, researchers have for the first time been able to detect and examine particles from tires and roads less than five micrometer in size. With the Raman tweezers, the researchers can trap and chemically analyze individual particles in a liquid environment.

"The research shows that we can use this combination of optical tweezers and Raman spectroscopy to characterize the microscopic particles that are created by the abrasion of tires on roads and often end up in the sea. This closes a gap between other available techniques, in terms of size," says Giovanni Volpe, professor at the Department of Physics.

The research project is an international collaboration led by Pietro Gucciardi from the CNR Institute for chemical and physical processes in Messina, Italy, and the study was published in *Environmental Science: Nano*.

The potential of Raman tweezers in environmental pollution analysis contribute to fill the technological gap for detection and identification of nanoplastics. The technology can be used to create more sustainable tires that does not create these polluting particles.

"The results from the study could be used to develop tires that produce less pollution or more biodegradable microparticles," says Giovanni Volpe.

More information: Raymond Gillibert et al, Raman tweezers for tire and road wear micro- and nanoparticles analysis, *Environmental Science:*

Nano (2021). DOI: 10.1039/D1EN00553G