Research into Brake, Tyre and Road Emissions

Up to now, emissions caused by tyre, brake and road surface wear, which are hazardous to health, have not been adequately captured. In the lead project NExT, researchers at TU Graz are developing precise analysis methods and realistic test procedures.

Philipp Jarke

Particles caused by brake, tyre and road surface wear are now responsible for the majority of traffic-related particulate matter and microplastics pollution. When stricter air quality limits come into force across the EU in 2030, it will be virtually impossible to comply with them without a reduction in wear-related emissions. As part of the new TU Graz lead project NExT – Non-Exhaust Emission Topics, researchers will be developing the necessary foundations for the reliable assessment and effective reduction of non-exhaust emissions over the next three years. To this end, interdisciplinary teams from five institutes under the project management of Cornelia Lex and Stefan Hausberger are conducting research into the formation of tyre, brake, road and rail wear particles. They are developing standardised, realistic test procedures for various vehicle classes and components as well as technical solutions that can significantly reduce emissions.

TU Graz is funding the lead project NExT, in which 25 researchers and 6 technicians will be involved, with almost 1.9 million euros.

STILL NO STANDARD METHOD FOR DETERMINING ROAD WEAR

The researchers are developing test methods with which both solid and volatile wear emissions can be completely captured and thus made measurable. This is the only way to assess emissions in real road and rail transport at all. Up to now, there has been no standard method for determining road wear, and tyre wear is only calculated from the weight loss of the tyres in relation to the distance driven. “Which and how many harmful ultra-fine particles are produced in the process has not been recorded,” says co-project manager Cornelia Lex. “We therefore see a risk that manufacturers will only optimise their tyres in terms of mass loss, but this may be accompanied by an increase in emissions of ultra-fine particles or the use of environmentally harmful components.”

“In order to measure and classify even the finest particles down to a size of 2.5 nanometres, we will develop highly sensitive sensors and examination methods with which we can precisely determine not only the number and size of the particles caused by brake, tyre and road wear, but also their morphology and chemical composition,” says co-project manager Stefan Hausberger. These findings serve as the basis for the development of technical solutions that can reduce emissions.

Leadprojekt NExt

Lunghammer – TU Graz