



META-THz – Metastructures for Non-Line-of-Sight (NLOS) Terahertz (THz) Communication

We live in a world driven by the constant exchange of data - we stream movies, video chat, and share photos and memes. All of this happens at lightning speed thanks to fiber-optic networks and Wi-Fi. But even these ultra-fast systems have their limits - especially when physical obstacles like walls or buildings block the direct path between devices. In such cases, signals can weaken or disappear entirely, breaking our digital connection.

This is where our project, **META-THz**, comes into play. We explore the use of **terahertz (THz) radiation**, a unique frequency range nestled between radio waves and optics. THz waves promise exceptionally high data transmission speeds, but they are also sensitive - easily absorbed by moisture or blocked by some physical barriers.

Our goal is to develop innovative, ultra-thin, flat **THz metastructures** capable of redirecting signals around obstacles - as if teaching waves to "turn the corner". These advanced optical structures can enable reliable, high-speed communication even when a direct line-of-sight is not available.

The project combines cutting-edge optical design, computer simulations, and experimental research with metastructures. The outcome will be novel components that not only improve the performance of future **6G networks** but could also find applications in **medical diagnostics**, **security imaging**, and **material quality control**.

We aim to build a future where data flows freely - quickly and reliably, regardless of any obstacles.