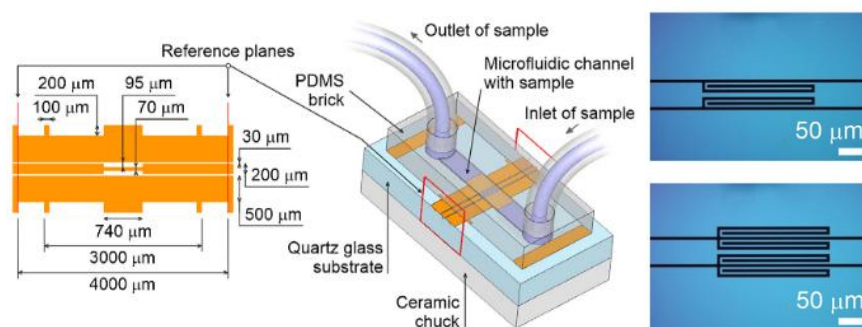


Advanced electromagnetic structures for energy concentration in fluidic biophysical applications (PhD program - Physical Engineering)

The work will focus on the design, fabrication, optimization and experimental verification of planar electromagnetic (EM) structures (GHz - sub-THz) for spatially precise delivery and deposition of energy into aqueous microvolumes (pL– μ L) in microfluidic chips compatible with optical microscopy. The goal is to create platforms enabling reproducible and quantifiable local EM exposure in a defined active zone for research into the influence of EM field/energy on biophysical and biomolecular processes (motor proteins, cytoskeleton, protein–protein interactions and related reaction and transport processes), while minimizing unwanted effects on the environment. The work will include the development of local dosimetry and calibration methods (e.g. fluorescent reporters), the connection of EM simulations with the experiment and the inverse design of EM structure to maximize absorption and desired effect in the liquid sample. The results of the work will contribute to a deeper understanding of the interaction of the electromagnetic field with biological matter.



Microfluidic and microwave microstructures from [1] and [2].

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