

## **Direct and inverse problems in periodic waveguides**

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Waveguides play important roles in many application areas, for example, in communications. An essential topic in the development of modern techniques is based on the deep understanding of the behaviours of the waves propagating in the waveguides. Then, numerical methods are proposed to simulate the physical processes and mathematical methods are developed to solve the related inverse problems.

In this talk, I will first focus on the direct problem, that is study the time-harmonic wave propagating in the periodic waveguide both analytically and numerically. The problem is modeled by the Helmholtz equation in a periodic strip. Afterwards, I will also introduce one example of the solution to an inverse problem.