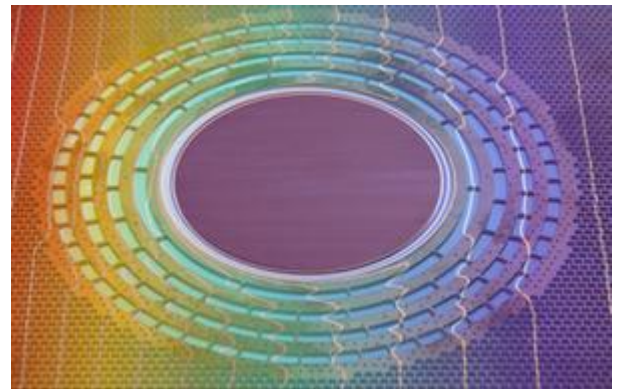


# Guided transport of diffusive particles

## Bachelor or Master student project

Heat conduction and particle diffusion are purely stochastic processes and hence a guided transport of heat or diffusing particles seems to be impossible. However, recently it has been shown experimentally that structures consisting of layers with different thermal conductivities can shield, concentrate and even invert the applied heat flux [1]. It is also possible to manipulate the heat flux in such a way that large obstructions within the heat conducting material are hidden (thermal cloak) [2].

In this project, we would like to show that analog structures can also be used to manipulate the diffusion of particles and investigate some possible experimental and technological applications.



*Thermal cloak: The cloak is designed such that the heat flux behind the object behaves as if there would not be any obstacle. Picture from [2].*

[1] Narayana, S. & Sato, Y. Phys. Rev. Lett. **2012**, 108, 214303

[2] Schittny, R. et al. Phys. Rev. Lett. **2013**, 110, 195901

### Requirements:

- Basic knowledge about statistical physics and partial differential equations (diffusion equation)
- Experience in programming (C++, Python) is welcome but not necessary

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