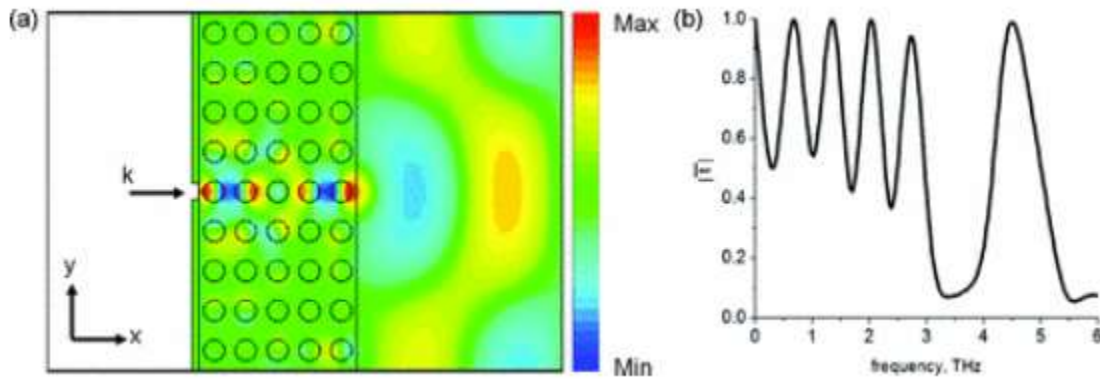


Research project title:

Physics and applications of epsilon-near-zero metamaterials



Description (and images, if possible):

One page is perfect, shorter if you wish it.

Your topic may evolve between today and next Spring. Now, that's not an issue.

Metamaterials with a refractive index of zero exhibit extreme physical properties, including infinite phase velocity and wavelength. Until recently it was not possible to implement such a material on a photonic chip. In this topic, the student is asked to work on the design and fabrication of on-chip integrated metamaterial with a refractive index of zero in the optical regime, and explore the physics of light propagation in zero-index media.

Experimental work: YES/NO (and short description)

While the students mainly focus on theoretical and numerical studies, proper experimental work will also be assigned to them according to the research plan discussed with the professors.

Modelling/theoretical work: YES/NO (and short description)

The students are trained to use numerical codes for gratings and some commercial softwares such as FDTD Solutions and COMSOL to simulate and study the optical properties of nanostructures.

Where the research activity will be carried out? (name of the lab/department)

The research will be carried out in the (1) Nanophotonics Laboratory and (2) Laboratory of Gratings and Measurement, Department of Precision Instrument, Tsinghua University.

Research internship will be carried out under the supervision of **Pr. Benfeng BAI**.

http://faculty.dpi.tsinghua.edu.cn/en_baibenfeng.html

https://en.wikipedia.org/wiki/Tsinghua_University :

Tsinghua University (abbreviated THU; Chinese: 清华大学; also romanized as Qinghua) is a major research university in Beijing, China and a member of the elite C9 League of Chinese universities. Since its establishment in 1911, it has graduated numerous Chinese leaders in politics, business, academia, and culture. Reflecting its motto of Self-Discipline and Social Commitment, Tsinghua University is dedicated to academic excellence, advancing the well-being of Chinese society, and global development. Tsinghua is perennially ranked as one of the top academic institutions in China, Asia, and worldwide, and was recognized as the 14th best university in the 2017 Times Higher Education World Reputation Rankings. Since 2015, Tsinghua has been ranked as the best engineering and computer science school in the world based on factors including total research output and performance. Tsinghua is a Class A institution in the Double First Class University Plan.



[Testimonials from French students who left in China in 2017 and 2018.](#)

<http://www.photonet.cnrs.fr/welcome>

Contact us : [http: eric.cassan@u-psud.fr](http://eric.cassan@u-psud.fr)