# Gate tunable edge magnetoplasmon resonators

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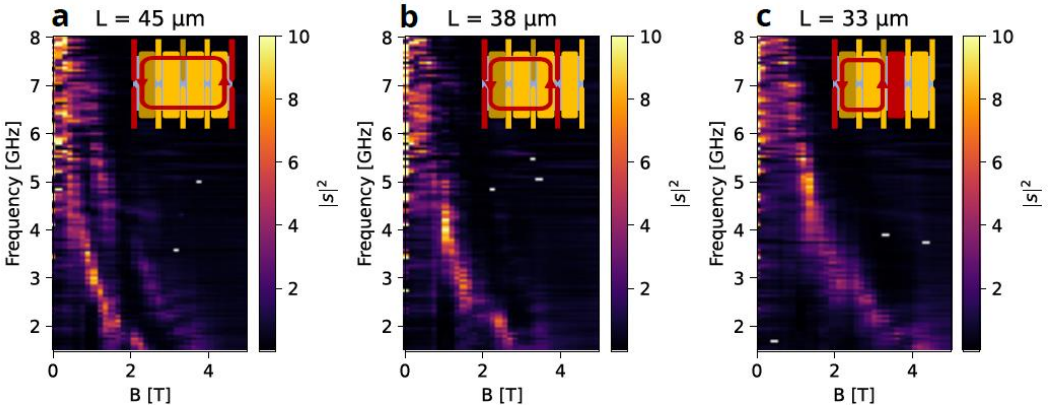
Edge magnetoplasmons (EMPs) are the low-energy excitations of a 2D electron gas (2DEG) in the Quantum Hall regime. These chiral excitations propagate along the electrostatic edge of the 2DEG at a velocity v. In a closed geometry, the edge states loop onto themselves, leading to resonant mode of the cavity of perimeter L with a resonance frequency f=v/L [1]. It has been proposed theoretically that by adding a QPC, so as to split this structure in two separate lobes, this system would realize a plasmonic interferometer. Such device should be able to detect the anyonic properties of quasiparticles exchanged at the level of the QPC and possibly reveal the non-abelian properties of quasiparticles in the 5/2 state of the fractional quantum Hall effect [2].

In this talk we will present our first results aimed at miniaturizing the EMP resonators in order to reach sizes compatible with interferometric measurements and the controlled threading of magnetic flux. We have studied electrostatically defined resonators with perimeters sizes ranging between 33 and 70 µm.

Additional top gates allow us to slow-down the magnetoplasmons by screening the interactions in the resonator such that the resonance frequency fall in the 1-8 GHz range [3].

Using a scattering matrix formalism for the calculation of the transmission signal we are able to interpret our result by taking into account the finite size effect of the input and output gates in our samples.




**Absorption maps:** Frequency vs magnetic field absorption maps obtained for three cavities whose sizes are defined by using a set of electrostatic gates.

[1] A. C. Mahoney et al., *Phys. Rev. X* **7**, 011007 (2017).
[2] J. Cano et al. *Phys. Rev. B* **88**, 165305 (2013).
[3] V. I. Talanskii et al. phys. Rev. B 46, 12427 (1992).