

# Colloquium Notice

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### *The reflectionless modes: an alternative spectrum for wave scattering*

To characterize scattering resonances, a useful tool is the complex resonance spectrum corresponding to eigenmodes (QNM) able to leak energy. However, for reflection/transmission problems (e.g. waveguides, gratings or screens), the complex resonance spectrum does not directly quantify transmission efficiency, and the question of good or perfect transmission is of great importance in many topics of wave physics: extraordinary optical transmission, topological states immune to backscattering, perfect transmission resonances, transmission eigenchannels through disordered media, reflectionless metamaterials or metasurfaces.

We present here an alternative spectrum allowing one to identify situations where perfect transmissions occur [1]. The operator yielding the spectrum of reflectionless modes is non-hermitian, and it is PT-symmetric for systems with spatial mirror symmetry. Eigenmodes (reflectionless modes) and eigenvalues (reflectionless complex frequencies) will be presented in various scattering situation, from the simplest 1D setup to several 2D waveguide geometries.

[1] A.-S. Bonnet-Ben Dhia, L. Chesnel, V. Pagneux. Trapped modes and reflectionless modes as eigenfunctions of the same spectral problem. Proc. R. Soc. A, 474(2213), 20180050 (2018)

Monday

**May 2, 2022**

Starts at 12:15 PM

If not mentioned otherwise, all [online Zoom.us events are accessible via this link](#)  
or use **meeting ID 829 2687 2594** and **passcode 866995**.