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【604】 Observation of a phononic quadrupole topological insulator

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Many topological band structures can be understood as consequences of a quantized Berry phase along phase-space trajectories, which arises from charge polarization. The theory relating topology and polarization has been recently extended to higher-order multipolar moments. Although originally based on the concept of charge polarization, the same theory can also be used to characterize the Bloch bands of neutral bosonic systems such as photonic or phononic crystals. In this talk, we will present an experimental observation of a quadrupole topological insulator in a phononic platform, based on the implementation of a quadrupole tight-binding model in a microfabricated silicon structure. Our measurements confirm the theoretical predictions and provide a route towards protected wave guides in three dimensional materials.

Primary authors: Dr SERRA GARCIA, Marc (ETH Zurich); Mr PERI, Valerio (ETH Zurich); LARSEN, Tom (EPFL); SÜSSTRUNK, Roman (ETH Zurich); Dr BILAL, Osama (Caltech); Dr VILLANUEVA, Luis Guillermo (EPFL); Prof. HUBER, Sebastian (ETH Zurich)

Presenter: Dr SERRA GARCIA, Marc (ETH Zurich)

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