lattice is able to transfer atoms because the potential minima are moving in space, in the quantum pump even though the potential minima are not moving in space (Fig. 1b) the pumping is achieved by a sequence of quantum tunnelling events between the double-wells. This amazing result also comes from topologically equivalent Hamiltonians that share the same Chern number of the occupied band.

The realization of a topological pump will have a far-reaching impact on modern condensed-matter physics. These experiments introduce a new experimental platform for studying topological quantum phenomena in many-body systems. Furthermore, introducing an interaction effect, which is feasible with ultracold atoms, will allow experimental exploration of the interplay between topological and correlation effects. It will also have a number of important applications, such as topological quantum computing[9]. ❐

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HISTORY OF SCIENCE

Foundation check

Picture Pisa. If you just conjured up an image of a leaning tower, you will not be the only one. For the physicists among you, this image may have included two objects falling from the top, referring to the iconic demonstration that things fall with the same acceleration. Although this famous sixteenth-century feat was sadly only ever a thought experiment, it reminds us of the role that Pisa played in introducing scientific thinking to Europe. Pietro Armienti has now suggested that this city may have laid the foundations for such thinking much earlier (*J. Cult. Herit.* **17,** 1–6; 2016).

As anyone who has flown into Pisa's Galileo Galilei airport will know, this city can proudly boast to be the birthplace of the father of modern physics. But four centuries earlier, Pisa was the home to the mathematician Leonardo Fibonacci, whose name is now synonymous with a sequence of numbers that he published in his 1202 treatise *Liber Abaci*: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, and so on.

With each number being the sum of the previous two, this sequence is frequently seen in nature — from the arrangement of leaves on a stem to the distribution of clouds of interstellar dust. Fibonacci himself introduced this sequence by considering the population growth of rabbits, providing a clear link between mathematics and the natural world. A restoration of the main entrance to the church of San Nicola in Pisa has exposed a fascinating monument (pictured) that was inspired by the insights provided by Fibonacci and raises some interesting questions.

Although the dates are not certain, it is likely that this feature was built in the thirteenth century when the maritime republic of Pisa was at the height of its powers. Armienti showed that it contains the first nine elements of the Fibonacci sequence, symmetries that reproduce regular polygons and recurring instances of the golden ratio. The golden ratio is the limit of the ratio of consecutive numbers in the sequence, but this connection wasn't thought to have been made until the seventeenth century.

This monument is therefore a captivating demonstration that artists, theologians, mathematicians and artisans all worked together in the city in the middle ages to showcase how the world conforms to recognizable rules. This city certainly helped to spread the modern view of scientific thinking but it looks like it may have been doing this for longer than we thought.

LUKE FLEET