COLÓQUIO - IFUSP

“CAN ONE COUNT THE SHAPE OF A DRUM?”

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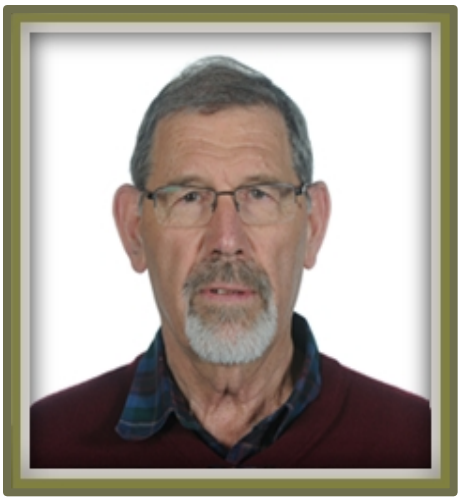

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Several decades ago Mark Kac asked his famous question:"Can one hear the shape of the drum?" - in other words- under which conditions, if at all, can the frequency spectrum of the drum vibrations determine the shape of the drum's boundary.This problem has many important implications in physics and mathematics, and in the first part of the talk I shall review the present status of this subject. In the second part, I shall address the new version of the question, in which one replaces "hear" by "count". That is, instead of considering the sequence of frequencies, one considers the sequence of the nodal numbers (the number of domains where the wave-function has the same sign) of the corresponding wave functions. I'll show that this sequence of integers stores information on the shape of the drum. Moreover, counting the drum in this way can also resolve ambiguous drums which have different shapes but produce the same spectra of vibrations.

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