

Senior Whitehead Prize: citation for Leonid Pastur

Short citation:

Professor Leonid Pastur of King's College London and the Institute for Low Temperature Physics and Engineering in Kharkiv (Ukraine) is awarded the Senior Whitehead Prize for his seminal work in mathematical physics, which has been of foundational importance in spectral theory, the theory of disordered systems, and in random matrix theory and its applications.

Long citation:

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Professor Pastur's formula for the limiting spectral density of Wishart random matrices, obtained in collaboration with Marchenko, is one of the most celebrated results in the field of random matrix theory. The Marchenko–Pastur distribution plays a central role in applications, for example to mathematical finance, data science, and to machine learning.

His work with Shcherbina, on universality in random matrix theory, is also of seminal importance. The asymptotic independence of local spectral statistics with respect to the probability measure, in the large-matrix limit, was conjectured by Freeman Dyson in the 1960s. Pastur and Shcherbina gave the first rigorous proof for a particular, canonical class of random matrices, paving the way for later significant contributions by others.

Another landmark achievement is his work with Goldsheid and Molchanov, in which they gave the first rigorous proof of Anderson localisation in disordered systems. Establishing the localisation of the eigenfunctions of the Schrödinger operator in disordered systems has been one of the most important problems in spectral analysis over the past 70 years. Their work contributed significantly to the subject and has been highly influential.

Professor Pastur is also widely admired for his research leadership. He has mentored many young researchers and has also taken on a range of senior academic leadership positions in Ukraine and internationally. He is a member of the National Academy of Sciences in Ukraine and is one of his country's leading scientists. He has enjoyed a long association with the UK; for several years he held a visiting professorship in Swansea, and he now holds a Chair at King's College, London.