

## Tom Bridgeland: **Stability and wall-crossing**

Over the last ten years we have learnt how to use our understanding of wall-crossing phenomena in derived categories of Calabi-Yau threefolds to prove results about generating functions for Donaldson-Thomas (DT) invariants. Examples include Toda's formula describing the effect of a flop on the DT curve-counting invariants, and the DT/PT correspondence between reduced DT curve-counting invariants and the stable pair invariants of Pandharipande-Thomas. The crucial ingredient in these developments is the theory of motivic Hall algebras, as developed by Joyce and Kontsevich-Soibelman. In the first lecture I will give an introduction to Hall algebras. The second lecture will discuss the results mentioned above together with the Kontsevich-Soibelman wall-crossing formula. The last lecture will discuss some conjectural relations between stability conditions and cluster varieties, inspired by the work of Gaiotto-Moore-Neitzke.