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On quantum curves and q-deformed isomonodromic equations.

In recent years, a rich interplay has developed between topological string theory, quantum operators associated with mirror curves, and isomonodromic equations together with their q-deformations. In this talk, I will focus on two operators: the well-known modified Mathieu operator and the less familiar but equally intriguing McCoy-Tracy-Wu operator. The latter is of particular interest due to its connections with the 2d Ising model, topological recursion, and Seiberg–Witten theory. I will show how both operators can be embedded into the geometric framework of quantum mirror curves and q-deformed Painleve equations, and in particular how this perspective leads to a simple functional relation between them.

This talk is based on joint work with M. Francois [arXiv:2503.21762], as well as earlier collaborations with G. Bonelli, P. Gavrylenko, Q. Hao, and A. Tanzini [arXiv:1603.01174, arXiv:1710.11603, arXiv:2304.11027].