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# Research Talk: q-series, Resurgence and Modularity

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In Zagier's paper titled "quantum modular forms", one of the first examples of quantum modular form is related to the q-series
$\sigma(q) = 1+\sum_{n=0}^{\infty}(-1)^n q^{n+1}(q)_n from Ramanujan's "Lost" Notebook. In this talk, I will discuss the resurgent structure of the fo$
$series \sigma(q)$: it is a simple resurgent structure which conjecturally encodes the modularity properties already studied by Zagier.
Furthermore, the same resurgent structure appears when considering formal power series associated to other q-series, such as the Kontsevich–Zagier q-series for trefoil and the q-series coming from the fermionic spectral traces of quantum-mechanical operators related with the quantization of the mirror curve of toric CY 3-folds (recently studied by C. Rella arXiv:2212.10606). Hence we expect to find analougus modularity properties by studying their resurgent structures.

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