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The melonic large N limit: from SYK to tensor field theory

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I will summarize the structure and scope of the so-called melonic large N expansion, which typically governs the large N behaviour of theories involving higher rank tensors. Compared to vector and matrix theories, what distinguishes it from the large N expansions of vector or matrix theories is that it is dominated by a non-trivial family of Feynman diagrams – the melon diagrams – which remains explicitly summable in a variety of situations. This provides a new analytical window into non-perturbative aspects of quantum theory, which has been taken advantage of to investigate strongly-interacting fermionic disordered systems (SYK model) and higher-dimensional generalizations.

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