

Operator dressing & proto-gauge theory from quantum mereology

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Instead of quantizing a classical phase space, the program of quantum mereology takes abstract Hamiltonian operators defined in some Hilbert space as its starting point, and investigates under which conditions such a setting induces semi-classical dynamics. We advance this program by studying the emergence of entire sets of degrees-of-freedom from random Hamiltonians. We show that these emergent degrees-of-freedom can be interpreted as the modes of a proto-gauge theory. And we demonstrate that these modes are overlapping, i.e. they obey non-trivial commutation relations and are reminiscent of (e.g. gravitationally) dressed operators and of the framework of holographic QFT that we recently proposed in <https://arxiv.org/abs/2402.11016>.

Working Group

WG1 - High Energy QG Theory

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