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Dissipative quantum glasses in optical cavities

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Strong light-matter interactions offer the prospects of quantum realizations of soft matter phases. We discuss how glassy phases of matter may appear with atomic ensembles in multi-mode optical cavities. Our computations show that some of these quantum optical glasses have no direct analogue in condensed matter realizations due to the photon-mediated long-range interactions and the nature of the driving and dissipation that occurs in the many-body cavity QED systems.