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【164】 Metastability and discrete spectrum of long-range systems

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Long lived quasi-stationary states (QSSs) are a signature characteristic of long-range interacting systems both in the classical and in the quantum realms. Despite their ubiquity, the fundamental mechanism at their root remains unknown. Here, we show that the spectrum of systems with power-law decaying couplings remains discrete up to the thermodynamic limit. Then, several traditional results on the chaotic nature of the spectrum in many-body quantum systems are not satisfied in presence of long-range interactions. In particular, the existence of QSSs may be traced back the finiteness of Poincaré recurrence times. This picture justifies and extends known results on the anomalous magnetization dynamics in systems with power-law decaying couplings.

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