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(G*) POS-G67 – Unconventional singularity in anti-parity-time symmetric cavity magnonics

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By engineering an anti-parity-time (anti-PT) symmetric cavity magnonics system with precise eigenspace controllability, we observe two different singularities in the same system. One type of singularity, the exceptional point (EP), is produced by tuning the magnon damping. Between two EPs, the maximal coherent superposition of photon and magnon states is robustly sustained by the preserved anti-PT symmetry. The other type of singularity, arising from the dissipative coupling of two antiresonances, is a zero-damping condition (ZDC). At the settings of ZDCs, the coupled system exhibits infinite discontinuities in the group delay. We find that both singularities coexist at the equator of the Bloch sphere, which reveals a unique hybrid state that simultaneously exhibits the maximal coherent superposition and slow light capability.

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