

# Dark Matter-Powered Stars and the High-Redshift Tidal Disruption Event Rate

Tidal disruption events (TDEs) result from stars being gravitationally-scattered into low angular momentum orbits around massive black holes. We show that the short lifetimes of massive Population III stars at high redshifts could significantly suppress the volumetric TDE rate because they are too short-lived to reach disruption-fated orbits. However, this suppression can be alleviated if captured dark matter (DM) within stellar interiors provides an additional energy source, thereby extending stellar lifetimes. We find that this TDE rate revival is most pronounced for DM particles with mass  $\mathcal{O}(\text{MeV})$  as this particle mass scale is optimal in the competing processes of DM accretion and evaporation in stars.

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