What sets the superconducting transition temperature for interacting flat bands?

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Superconductivity in the limit of a vanishing bandwidth in isolated bands is a classic example of a non-perturbative problem, where BCS theory does not apply. What sets the superconducting phase stiffness, and relatedly the transition temperature, in this limit is of both fundamental and practical interest. This question has become especially relevant with the discovery of superconductivity in moiré materials. I will discuss our recent insights into this problem, starting from the non-perturbative limit, and examine the interplay between superconductivity and various competing orders as a function of the minimal spatial extent of localized Wannier functions. I will end by deriving the integrated optical spectral weight for partially filled electronic flat bands with generic density-density interactions. Our formalism can be applied to a host of topologically (non-)trivial flat band systems, including twisted bilayer graphene.