Special Issue

Flat Bands: Fundamentals and Applications

Message from the Guest Editors

Flat-band systems, as represented by lattices hosting at least one completely dispersionless energy band, have attracted enormous interest, ranging from condensed matter to exciton polaritons, and from ultracold atoms to photonics. As the kinetic energy is completely quenched, particle-enhanced interaction makes flat-band systems a perfect candidate for the investigation of complex many-body quantum states and strongly correlated many-body physics in the absence of a magnetic field. On the other hand, advances in fabrication techniques not only provide insights into fundamental concepts and phenomena and motivate the continued study of disordered, quantum, and strongly interacting flat band systems but also lead to new techniques for harnessing flat-band physics in future micro- and nano-scale devices. In this Special Issue, research areas may include (but are not limited to) the following: Strongly correlated spin, electronic and bosonic systems with flat bands Finetuning and perturbations of flat bands Flat bands and disorder/nonlinearity Flat bands and non-Hermitian Flat bands and topology Novel experimental platforms Flat bands and applications

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Deadline for manuscript submissions

closed (20 June 2023)

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