Rainbow Hamiltonian Cycles in Edge-Colored Graphs

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A rainbow Hamiltonian cycle is a colored hamiltonian cycle where the edges are colored with distinct colors. Problems about rainbow hamiltonian cycles in an edge-colored graph have been researched by many authors during the past few years. Especially, Aharoni recently conjectured that every edge-colored multigraph with order n which is the union of n edge disjoint Dirac graphs contains a rainbow hamiltonian cycle. We prove it asymptotically. In fact, we show that for each $\varepsilon > 0$, there exists a positive integer $N > 0$ such that when $n > N$, every n-edge-colored multigraph G with order n in which the minimum degree of every maximal monochromatic subgraph is at least $(\frac{1}{2} + \varepsilon)n$ contains a rainbow Hamiltonian cycle. We survey some problems and results in this field and also give an outline of this proof. This talk is based on joint work with Guanghui Wang(Shandong University).