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Ryan Martin* (rymartin@iastate.edu), 396 Carver Hall, Department of Mathematics, Iowa State University, Ames, IA 50010. *Tiling in Multipartite Graphs.*

We present some results on tiling (or packing) graphs in multipartite graphs. This is a question very similar to the Hajnal-Szemerédi theorem, which gives sufficient minimum-degree conditions for an n -vertex graph to have a subgraph of $\lfloor n/r \rfloor$ vertex-disjoint copies of K_r . We consider a multipartite version. That is, given an r -partite graph with N vertices in each partition, what is the minimum-degree required of the bipartite graph induced by each pair of color-classes so that it contains N vertex-disjoint copies of K_r ? When $r = 3$ and N is sufficiently large, a degree condition of $(2/3)N$ is sufficient with the exception of a single graph when N is an odd multiple of 3. When $r = 4$ and N is sufficiently large, a degree condition of $(3/4)N$ is sufficient and there is no exceptional graph. There are also bounds on the degree condition for $r > 4$ by Csaba and Mydlarz.

This question has also been generalized to finding minimum-degree conditions for packings of some arbitrary r -colorable graph. The case $r = 2$ was answered precisely by Zhao. The case $r = 3$ is more complex and we provide some tight bounds on the required degree condition.

This talk includes joint work with Csaba Magyar, with Endre Szemerédi and with Yi Zhao. (Received August 30, 2009)