1067-05-1114 **Seog-Jin Kim**, **Alexandr V. Kostochka**, **Douglas B. West** and **Hehui Wu*** (hehuiwu2@illinois.edu), Department of Mathematics, University of Illinois at Urbana-Champaign, 1409 W Green Street, Urbana, IL 61801, and **Xuding Zhu**. *Decomposition of sparse graphs using forests and a graph with bounded degree.*

From the Matroid Union Theorem by Edmonds and Nash-Willams, the Tree Packing Theorem will immediately follow: a graph decomposes into k forests if and only if the arboricity $\max_{H\subseteq G}\lceil |E(H)|/(|V(H)|-1)\rceil$ is at most k. We consider the *fractional arboricity* $\max_{H\subseteq G}\frac{|E(H)|}{|V(H)|-1}$. The Nine Dragon Tree(NDT) Conjecture, posted by Montassier et al., states that if the fractional arboricity of a graph is at most $k+\frac{d}{k+d+1}$, then the graph decomposes into $k+1$ forests, with one of them having maximum degree at most d.

For $d \geq k+1$, we prove a sharp sparseness condition for decomposability into k forests and a graph having maximum degree at most d. Consequences are that every graph with fractional arboricity at most $k+d/(k+d+1)$ has such a decomposition. For $d \leq k+1$, we prove that every graph with fractional arboricity at most $k+d/(2k+2)$ decomposes into $k+1$ forests, with one of them having maximum degree at most d. This implies the NDT Conjecture for the case $d = k+1$. Also, for $k = 1$, we prove that the NDT Conjecture is true for $d \leq 6$. (Received September 19, 2010)