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**Amin Bahmanian\*** (mzb0004@auburn.edu), Department of Mathematics, Auburn University, Auburn, AL 36849. *Detachments of Amalgamated 3-uniform Hypergraphs.*

In this paper we use Nash-Williams lemma on laminar families to prove a detachment theorem for amalgamated 3-uniform hypergraphs, which yields a substantial generalization of previous amalgamation theorems by Hilton, Rodger and Nash-Williams.

To demonstrate the power of our detachment theorem, we show that the complete 3-uniform  $n$ -partite multi-hypergraph  $\lambda K_{m_1, \dots, m_n}^3$  can be expressed as the union  $\mathcal{G}_1 \cup \dots \cup \mathcal{G}_k$  of  $k$  edge-disjoint factors, where for  $i = 1, \dots, k$ ,  $\mathcal{G}_i$  is  $r_i$ -regular if and only if:

- (i)  $m_i = m_j := m$  for all  $1 \leq i, j \leq k$ ,
- (ii)  $3 \mid r_i m n$  for each  $i$ ,  $1 \leq i \leq k$ , and
- (iii)  $\sum_{i=1}^k r_i = \lambda \binom{n-1}{2} m^2$ ,

which yields a generalization of Baranyai theorems for 3-uniform hypergraphs. Our result in particular leads to a polynomial time algorithm for parallelisms, while all other known constructions are of exponential complexity. (Received July 28, 2010)