

UNIVERSITY OF DELAWARE  
DEPARTMENT OF MATHEMATICAL SCIENCES  
DISCRETE MATHEMATICS SEMINAR

Friday May 3, 2002, 3:30pm, Room 436 Ewing Hall

# Small Sumsets in Abelian Groups

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In 1953 M. Kneser proved the following generalization of the Cauchy-Davenport theorem. If  $A, B$  are finite subsets of an abelian group (written additively), then either  $|A + B| \geq |A| + |B| - 1$  or there exists a nonzero element  $g$  so that  $A + B + g = A + B$ . The main purpose of this talk is to give a new short proof of this theorem. The interesting feature of our proof is that it avoids the use of the Dyson e-transform, a key tool in earlier proofs. Our argument also leads naturally to a characterization of those pairs of subsets  $A, B$  for which  $|A + B| < |A| + |B|$ .