

1077-VJ-2404

**George E Andrews, Frank G Garvan and Jie L Liang\*** (jli1@knights.ucf.edu), McNair Program, P.O. Box 162001, Orlando, FL 32816. *Combinatorial Interpretations of Congruences for the  $spt$ -function.*

Let  $spt(n)$  denote the total number of appearances of the smallest parts in all the partitions of  $n$ . In 1988, the second author gave new combinatorial interpretations of Ramanujan's partition congruences mod 5, 7 and 11 in terms of a crank for weighted vector partitions. In 2008, the first author found Ramanujan-type congruences for the  $spt$ -function mod 5, 7 and 13. We give new combinatorial interpretations of the  $spt$ -congruences mod 5 and 7. These are in terms of the same crank but for a restricted set of vector partitions. The proof depends on relating the  $spt$ -crank with the crank of vector partitions and the Dyson rank of ordinary partitions. We derive a number of identities for  $spt$ -crank modulo 5 and 7. We prove a surprising result that all the  $spt$ -crank coefficients are nonnegative. (Received September 22, 2011)