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Noah Kravitz* (noah.kravitz@yale.edu). *Counting Simultaneous Core Partitions with d -Distinct Parts.*

An integer partition is called s -core if its associated Young diagram has no hook of length s , and we say that an integer partition has d -distinct parts if its consecutive parts differ by at least d . In this talk, we investigate the number $N_{d,r}(s)$ of integer partitions with d -distinct parts that are simultaneously s -core and $s+r$ -core. After reducing this problem to the enumeration of certain finite subsets of the natural numbers, we prove several results for the regime $r \leq d$, including a recurrence relation that was conjectured by Sahin in 2018. We also derive generating functions, asymptotics, and exact formulas for $N_{d,r}(s)$ when r is within d of a multiple of s . Finally, we exhibit a surprising connection to A -restricted compositions. (Received September 13, 2018)