1107-15-110 **Anthony Iarrobino**, **Leila Khatami*** (khatamil@union.edu), **Bart Van Steirteghem** and **Rui Zhao**. *Nilpotent matrices having a given Jordan type as maximum commuting nilpotent orbit.*

Let B be an $n \times n$ nilpotent matrix with Jordan block sizes given by the partition P of n. It is well-known that the nilpotent commutator of B consisting of all nilpotent matrices that commute with B is an irreducible variety. So there is a unique partition $\mathcal{Q}(P)$ that is the Jordan partition of a generic element of the nilpotent commutator of B. In this talk we report the results of a joint work with Anthony Iarrobino, Bart Van Steirteghem and Rui Zhao in which we study the inverse map $\mathcal{Q}^{-1}$. We prove that if $Q = (u, u-r)$, with $r \geq 2$, is a partition with two parts, then partitions in $\mathcal{Q}^{-1}$ can be arranged in an $(r-1) \times (u-r)$ table where the entry in the k-th row and ℓ-th column has $k+\ell$ parts. The set $\mathcal{Q}^{-1}$ is known to be empty when $r \leq 1$. Our result confirms a conjecture by P. Oblak from 2012 and a refinement of her conjecture by R. Zhao. We also generalize the statement to propose a Box Conjecture for the set of partitions $\mathcal{Q}^{-1}(Q)$ for a partition Q with an arbitrary number of parts. (Received January 07, 2015)