1120-42-226   **Jameson Cahill**, **Xuemei Chen*** (xchen@nmsu.edu) and **Rongrong Wang**. *The gap between NSP and RIP.*

The null space property (NSP) and the restricted isometry property (RIP) are two properties which have received considerable attention in the compressed sensing literature. As the name suggests, NSP is a property that depends solely on the null space of the measurement procedure and as such, any two matrices which have the same null space will have NSP if either one of them does. On the other hand, RIP is a property of the measurement procedure itself, and given an RIP matrix it is straightforward to construct another matrix with the same null space that is not RIP. We say a matrix is RIP-NSP if it has the same null space as an RIP matrix. We show that such matrices can provide robust recovery of compressible signals under Basis pursuit which in many applicable settings is comparable to the guarantee that RIP provides. More importantly, we constructively show that the RIP-NSP is stronger than NSP with the aid of this robust recovery result, which shows that RIP is fundamentally stronger than NSP. (Received February 22, 2016)