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*Exceptional sets for orthogonal directions*

It is well known that if  $A \subseteq \mathbb{R}^n$  is an analytic set of Hausdorff dimension  $a$ , then  $\dim_H(\pi_V A) = \min\{a, k\}$  for a.e.  $V \in G(n, k)$ , where  $\pi_V$  is the orthogonal projection of  $A$  onto  $V$ . In this talk we discuss how large the exceptional set

$$\{V \in G(n, k) \mid \dim_H(\pi_V A) < s\}$$

can be for a given  $s \leq \min\{a, k\}$ . We improve previously known lower bounds on the dimension of the exceptional set, and we show that our estimates are sharp for  $k = 1$  and for  $k = n - 1$ . This is joint work with Peter Cholak, Marianna Csornyei, Neil Lutz, Patrick Lutz and Elvira Mayordomo.