1106-05-1874 **Albert R. Bush*** (albertbush@gmail.com) and **Ernie Croot**. *Few Products, Many h-fold Sums: Progress on the Multi-fold Sum-Product Problem in the Reals.*

The well-known sum-product conjecture of Erdős and Szemerédi states that either the sumset $A+A$ or the product set $A.A$ are nearly maximal in size, $\Omega(|A|^{2-\epsilon})$. They made a similar conjecture that the h-fold sumset or the h-fold product set is of size $\Omega(|A|^{h-\epsilon})$. While resolution of the h-fold conjecture is currently out of reach, weaker forms have seen some success. Chang proved that if A is a set of integers and $|A.A| \leq K|A|$, then the h-fold sumset of A is of size $\Omega_K(|A|^h)$. However, if A is a set of reals, the best known bounds have all been much weaker: $O(|A|^{\log h})$. We prove the first bound that is stronger than logarithmic in the exponent: $|A|^{\exp(\sqrt{\log h})}$. Our proof incorporates the graph-theoretic technique of dependent random choice, a bound on the Tarry-Escott problem in number theory, and well-known additive combinatorial tools. (Received September 15, 2014)