

---

**ELISABETH WERNER**, Case Western Reserve University

*On the geometry of projective tensor products*

We study the volume ratio of the projective tensor products  $\ell_p^n \otimes_\pi \ell_q^n \otimes_\pi \ell_r^n$  with  $1 \leq p \leq q \leq r \leq \infty$ . We obtain asymptotic formulas that are sharp in almost all cases. As a consequence of our estimates, these spaces allow a nearly Euclidean decomposition of Kashin type whenever  $1 \leq p \leq q \leq r \leq 2$  or  $1 \leq p \leq 2 \leq r \leq \infty$  and  $q = 2$ . Also, from the Bourgain-Milman bound on the volume ratio of Banach spaces in terms of their cotype 2 constant, we obtain information on the cotype of these 3-fold projective tensor products. Our results naturally generalize to  $k$ -fold products  $\ell_{p_1}^n \otimes_\pi \cdots \otimes_\pi \ell_{p_k}^n$  with  $k \in \mathbb{N}$  and  $1 \leq p_1 \leq \cdots \leq p_k \leq \infty$ .

Based on joint work with O. Giladi, J. Prochno, C. Schuett and N. Tomczak-Jaegermann.