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X Chen, E Goodman, V Gonzales and **K Okoudjou*** (kasso@math.umd.edu), 2111 Kirwan Hall, Department of Mathematics, University of Maryland, College Park, MD. *New results in minimizing the p -frame potentials.* Preliminary report.

Given $d \geq 2$, $p \in (0, \infty]$, and $N \geq 2$, let

$$\mu_{p,d,N} = \min \left\{ \sum_{k,\ell=1}^N |\langle \varphi_k, \varphi_\ell \rangle|^p : \{\varphi_k\}_{k=1}^N \subset S^{d-1} \right\}$$

where S^{d-1} is the unit sphere in \mathbb{R}^d . Of the many questions one can ask about this function, two are of interest to us in this talk:

- For fixed d and N , find an explicit formula for the function $\mu_{p,d,N}$.
- For fixed d and N , what are the optimal configurations $\{\varphi_k\}_{k=1}^N \subset S^{d-1}$?

Answers to these questions are known in certain cases, e.g., when $p = 2$ Benedetto and Fickus proved that FUNTFs are the optimal configurations. In addition, for certain values of p , the optimal configurations are related to ETFs or Grassmannian frames.

In this talk, we shall report on recent progress made in finding in answering these question for $d = 2$ and $N \geq 4$. In addition we shall present some numerical results for the case $d \geq 3$, and $N = d + 1$.

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