

**19th Workshop: Noncommutative Probability, Noncommutative Harmonic Analysis  
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**ABSTRACT**

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**Multilinear Fourier multipliers on non-commutative  $L_p$  spaces.**

**Abstract:** If  $m$  is a function defined on a locally compact abelian group  $G$ , the Fourier multiplier  $T_m$  associated with  $m$  is an operator acting on the  $L_p$  spaces of the dual group  $\widehat{G}$ . When the group is non-commutative, the appropriate spaces on which  $T_m$  should act are the non-commutative  $L_p$  spaces of the group von Neumann algebra. If  $m$  is now a function on  $G^{\times n}$ , one can define an associated multilinear Fourier multiplier  $T_m$ , which acts on some tuple of  $L_p$  spaces. These are interesting objects even in the Euclidean case, and the techniques used to study linear Fourier multipliers do not always extend well. In this talk, based on the articles cited below, I will explore the theory of multilinear Fourier multipliers associated with non-commutative groups, and show how several results can be generalized from the linear case. In particular, I will outline a ‘De Leeuw type’ restriction theorem relating the norms of a multiplier on a group and its subgroup, a ‘transference’ theorem about the norms of multilinear Fourier and Schur multipliers, and as a corollary, use these to show how one may construct multilinear Fourier multipliers on the Heisenberg group.

- [1] M. Caspers, B. Janssens, A. Krishnaswamy-Usha, and L. Miaskiowski, 2022. Local and multilinear noncommutative de Leeuw theorems. arXiv preprint arXiv:2201.10400.
- [2] M. Caspers, A. Krishnaswamy-Usha and G. Vos, 2022. Multilinear transference of Fourier and Schur multipliers acting on non-commutative  $L_p$ -spaces. arXiv preprint arXiv:2206.00549.