On m-factorizations of complete multigraphs and finite projective spaces

The complete multigraph λK_v has v vertices and λ edges joining each pair of vertices. An m-factor of the complete multigraph λK_v is a set of pairwise vertex-disjoint m-regular subgraphs, such that these subgraphs induce a partition of the vertices. An m-factorization of λK_v is a set of pairwise edge-disjoint m-factors such that these m-factors induce a partition of the edges. If the m-factors are pairwise distinct, then it is called *simple*. Furthermore, an m-factorization of λK_v is decomposable if there exist positive integers λ_1 and λ_2 such that $\lambda_1 + \lambda_2 = \lambda$ and λK_v is the union of the m-factorizations $\lambda_1 K_v$ and $\lambda_2 K_v$, otherwise it is called *indecomposable*.

In this talk we will discuss simple and indecomposable m-factorizations of λK_v related to finite projective spaces for different values of m, λ and v.