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**TITLE: Algebraic versions of the graph Removal Lemma**

**ABSTRACT:**

An important tool in graph theory is the Szemerédi Regularity Lemma which allows to partition any graph into pieces that mutually behave in a pseudorandom way. One of its most important corollaries is the Removal Lemma. Vaguely speaking, the lemma says that every graph contains many copies of a subgraph  $H$  or it is almost  $H$ -free. In 2005, Green proved an analogue of the Szemerédi Regularity Lemma for Abelian groups and derived a statement for Abelian groups analogous to the graph Removal Lemma. In this talk, I would like to survey a continuation of this line of research with my joint work with Serra and Venna which extends the result of Green to non-Abelian groups and systems of equations (the latter result was also proved by Shapira). Szemerédi's theorem on the existence of arithmetic progressions in dense subsets of integers can be obtained as a direct corollary of these results.