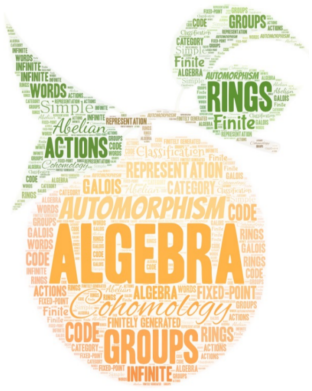
Al@Bicocca seminar

You are all welcome to the next bite of the series

"Al@Bicocca"

which is meant to give you a small taste of the Algebra at Bicocca and beyond



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Online venue: WebEx
University of Milano-Bicocca
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The Herzog–Schönheim Conjecture for finite simple groups

Abstract: In the 1950's Davenport, Mirsky, Newman and Rado proved that if the integers are partitioned by a finite set of arithmetic progressions, then the largest difference must appear more than once. In other words, if $g_1, \ldots, g_n$ and $a_1 \leq a_2 \leq \ldots \leq a_n$ are integers such that $\{g_i + a_i\mathbb{Z}\}_{i=1}^n$ is a partition of $\mathbb{Z}$ then $a_{n-1} = a_n$. This confirmed a conjecture of Erdös and opened a broad area of research (see Covering systems of Paul Erdös. Past, present and future, Paul Erdös and his mathematics, I (Budapest, 1999), Bolyai Soc. Math. Stud., vol. 11, pp. 581-627. János Bolyai Math. Soc., Budapest (2002) for a detailed bibliography). The Herzog–Schönheim Conjecture (1974) states that, if a group G is partitioned into cosets $H_1x_1, \ldots, H_nx_n$, then the indices $|G : H_i|$, $i = 1, \ldots, n$, cannot be pairwise distinct. It is known that, in order to prove this conjecture in general, it is enough to prove it for finite groups. The conjecture holds for finite groups having a Sylow tower (Berger et al. 1987), so in particular for supersolvable groups. In this talk, I will present a proof of this conjecture for all finite simple groups and symmetric groups. This is a joint work with Leo Margolis (Universidad Autónoma de Madrid). A preprint of the paper is available at the following ArXiv link: `https://arxiv.org/abs/2509.25118`