

# On the lower central series of partitioned surface braid groups

Martin Palmer-Anghel // Topology Seminar, IMAR // 20 January 2023

## Abstract.

Every group  $G$  has a natural descending filtration that measures its failure to be abelian: its *lower central series*  $\Gamma_*(G)$ . Understanding this filtration and its associated Lie algebra  $\mathfrak{L}_*(G)$  can give deep information about the underlying structure of  $G$ . The most fundamental question to ask about this filtration is whether it *stops*, i.e. whether there is some  $i$  such that  $\Gamma_i(G) = \Gamma_{i+n}(G)$  for all  $n \geq 0$ .

I will describe the answer to this question for *partitioned surface braid groups*  $G = \mathbf{B}_\lambda(S)$  for any surface  $S$  and any partition  $\lambda$  of a positive integer  $n$ . The answer depends very subtly on the sizes of the blocks of  $\lambda$  and on the topology of  $S$ , with the two most difficult cases being the 2-sphere and the projective plane.

*Based on joint work with Jacques Darné and Arthur Soulié (Memoirs of the AMS, 2023, to appear; see also [arxiv:2201.03542](https://arxiv.org/abs/2201.03542))*