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Samuel F Hopkins* (shopkins@umn.edu). *Cyclic sieving for plane partitions and symmetry.*

The cyclic sieving phenomenon of Reiner, Stanton, and White says that we can often count fixed points for a cyclic group acting on a combinatorial set by plugging roots of unity into a polynomial related to this set. One of the most impressive instances of the cyclic sieving phenomenon is a theorem of Rhoades asserting that the set of plane partitions in a rectangular box under the action of promotion exhibits cyclic sieving. In Rhoades's result the sieving polynomial is the size generating function for these plane partitions, which has a well-known product formula due to MacMahon. We extend Rhoades's result by studying the interaction of promotion with symmetries of plane partitions. We obtain cyclic sieving-like formulas in this context where the relevant polynomial is the size generating function for symmetric plane partitions, whose product formula was conjectured by MacMahon and proved by Andrews. We then go on to consider the way the symmetries interact with rowmotion, another operator acting on plane partitions which is closely related to promotion. We end by explaining the connection of our work to some earlier conjectures we made concerning rowmotion acting on the P-partitions of various "triangular" posets P . (Received September 12, 2019)