1139-05-408 **Steven Simon*** (ssimon@bard.edu). *Hyperplane Equipartitions Plus Constraints.*

While equivariant methods have seen many fruitful applications in geometric combinatorics, their inability to answer the now settled Topological Tverberg Conjecture has made apparent the need to move beyond the use of Borsuk-Ulam type theorems alone. This impression holds as well for one of the most famous problems in the field, dating back to at least 1960, which seeks the minimum dimension $d := \Delta(m;k)$ such that any m mass distributions in $\mathbb{R}^d$ can be simultaneous equipartitioned by k hyperplanes. Precise values of $\Delta(m;k)$ have been obtained in only few cases, and the best-known general upper bound $U(m;k)$ typically far exceeds the conjectured-tight lower bound arising from degrees of freedom. By analogy with the "constraint method" of Blagojević, Frick, and Ziegler for Tverberg-type results, we show how the imposition of further conditions – on the hyperplane arrangements themselves (e.g., orthogonality, prescribed flat containment) and/or the equipartition of additionally prescribed collections of masses by successively fewer hyperplanes ("cascades") – yields a variety optimal results in dimension $U(m;k)$, including in dimensions *below* $\Delta(m+1;k)$, which are still extractable via equivariance. (Received February 17, 2018)