

# Algebra/Topology Seminar

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## ALGEBRAIC STABILITY OF ZIGZAG PERSISTENCE MODULES

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1:15 p.m. in ES-143

**ABSTRACT.** The stability theorem for persistent homology is a central result in topological data analysis. While the original formulation of the result concerns the persistence barcodes of  $\mathbb{R}$ -valued functions, the result was later cast in a more general algebraic form, in the language of persistence modules and interleavings. In this work, we establish an analogue of this algebraic stability theorem for zigzag persistence modules. To do so, we functorially extend each zigzag persistence module to a two-dimensional persistence module, and establish an algebraic stability theorem for these extensions. As an application of our main theorem, we strengthen a result of Bauer, Munch, and Wang on the stability of the persistent homology of Reeb graphs. Our main result also yields an alternative proof of the stability theorem for level set persistent homology of Carlsson et al.