# An Algorithm to Detect Non-order-preserving Braids

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A 3-manifold is *bi-orderable* when its fundamental group is a bi-orderable group. Orderability has played a significant role in studying when a 3-manifold is an *L-space*, that is, a manifold with the simplest possible Heegaard Floer homology, and when that manifold admits a geometric decomposition called a taut foliation. A motivating question, related to the L-space Conjecture, *is there a topological characterization of 3-manifolds with bi-orderable fundamental group?* In this talk, we will discuss this motivating question for braided links in $S^3$, and restate the problem in terms of *order-preserving braids*. We will discuss a new implemented algorithm which, given a braid $\beta$, terminates if $\beta$ is *not* order-preserving. This algorithm returns a complete proof that $\beta$ is not order-preserving.

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