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Analyzing the dynamics of pattern formation in the space of persistence diagrams MIROSLAV KRAMAR, KONSTANTIN MISCHAIKOW, Rutgers, MICHAEL SCHATZ, JEFFREY TITHOF, Georga Tech, MARK PAUL, MU XU, Virginia Tech — Persistence diagrams are a relatively new topological tool for describing and quantifying complicated patterns in a simple but meaningful way. We will demonstrate this technique on patterns appearing inRayleigh-Benard convection. This procedure allows us to transform experimental or numerical data from experiment or simulation into a point cloud in the space of persistence diagrams. There are a variety of metrics that can be imposed on the space of persistence diagrams. By choosing different metrics one can interrogate the pattern locally or globally, which provides deeper insight into the dynamics of the process of pattern formation. Because the quantification is being done in the space of persistence diagrams this technique allows us to compare directly numerical simulations with experimental data.

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