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Using Topology to locate the position where fully Three-Dimensional Reconnection Occurs WALTER GEKELMAN, University of California, Los Angeles, TIM DEHAAS, Tri Alpha Energy, CHRISTOPHER PRIOR, ANTHONY YEATES, Dept. of Math Science, Durham University — In two dimensional reconnection involving neutral sheets and magnetic islands it is not difficult to recognize reconnection sites when detailed data sets or simulations are available. This is not the case in fully three dimensional reconnection where there are no obvious reconnection sites. A Quasi Seperatrix Layer (QSL) which, in essence, measures the rapid divergence of magnetic field lines indicates that reconnection is occurring within it. This serves to narrow down the range of possible positions but does not pinpoint it. Here we use a newly developed topological framework for precisely quantifying reconnective activity in complex magnetic fields. It is demonstrated that the regions with the highest reconnective activity are not always where the largest QSL signatures are, thus indicating this is a more complete methodology for quantifying reconnective activity than standard methods. This framework should serve as a model for reconnection analysis in future studies. The work was performed at the Basic Plasma Science Facility, which is funded by DOE (DE-FC02-07ER54918) and the National Science Foundation (NSF-PHY 1036140).

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