Analysis Tools for Fusion Simulations[1] ALLEN SANDERSON, SCI Institute, Univ. of Utah, SCOTT KRUGER, Tech-X Corp, JOSHUA BRESLAU, STEPHANE ETHIER, PPPL, VACET COLLABORATION, CEMM COLLABORATION, GPS-TTBP COLLABORATION — In this talk, we highlight two analysis tools for evaluating fusion simulations. The first tool is for interactively exploring the topology of the magnetic field using a Poincaré map. Unlike traditional Poincaré maps that rely on a dense set of puncture points to form a contiguous representation of the magnetic surface we use a sparse set of connected puncture points. The puncture points are connected based on a rational approximation of the safety factor. The resulting analysis not only allows for the visualization of magnetic surfaces using a minimal number of puncture points but also identifies features such as magnetic islands. The second tool is for performing query based analysis on simulations utilizing particles. To assist in the analysis of simulation codes that utilize millions to billions of particles we have developed analysis tools that combine parallel coordinates plots combine with accelerated index searches. Parallel coordinate plots allow one to identify trends within multivariate data while accelerated index searches allows one to quickly perform range based queries on a large number of multivariate entries.

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