# Focus+Context Methods for Particle-Based Data

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The interactive visual inspection of 3D or higher-dimensional particle datasets allows to gain in-depth insight, especially for initial exploration tasks. The presence of relevant dynamics on multiple levels, from per-particle level to per-cluster level, poses numerous challenges for an effective visualization. Structures are typically dense and highly dynamic over time, and are thus likely subject to heavy occlusion. Furthermore, since simulation systems become increasingly powerful, the number of particles per time step increases steadily, reaching data set sizes of several billion particles. This huge amount of data is challenging, from not only a computational perspective, but also reaches limits of what a human researcher can comprehend.

In this talk, ideas to combine particle visualization with the concept of Focus+Context are presented. Focus+Context is based on showing a selection of the data - the focus - in high detail, while the remaining data - the context - is visualized in reduced detail within the same image. This enables efficient and scalable visualizations that retain as much relevant information as possible while still being comprehensible.
Various novel methods for static and dynamic 3D and nD particle data are outlined, including their benefits and potential for further research.