Plasma Analysis

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February 14, 2016

1 Introduction

We will use CUDA to efficiently calculate the topological properties of magnetic field lines as generated by Chris Smiet's simulations.

2 Data representation

The dataset we use is a set of 256^3 points in a regular rectangular grid for which the (x, y, z) components of the magnetic field are given. This sort of dataset has a strong correspondence with a 3D texture on a GPU. Using this representation in CUDA has several advantages, of which the hardware trilinear interpolation is the most notable.

3 Coordinate systems