

A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

DISPUTATION

Donnerstag, 4. August 2022, 14:00 Uhr

[WebEx](#)

Disputation über die Doktorarbeit von

Herrn Gottfried Hastermann

Thema der Dissertation:

Analysis of the Cell-Vertex Finite Volume Method for Pseudo-Incompressible Divergence Constraints on Quadrilateral and Cuboid Meshes

Thema der Disputation:

Structure preserving integration of the Vlasov-Poisson equation

Die Arbeit wurde unter der Betreuung von **Prof. Dr. R. Klein** durchgeführt.

Abstract: The Vlasov-Poisson equation describes the time evolution of the phase space density of (infinitely) many particles subject to Newton or Coulomb type binary interaction forces, but without collisions.

We motivate the equation as a mean field limit and discuss some mathematical properties. As phase space has six dimensions, the numerical treatment with purely grid based methods is computationally challenging. One way of reducing the required computational effort, is to follow characteristic solutions and apply the particle in cell method. In this talk we will discuss a more recent structure preserving variant thereof, named geometric electromagnetic particle in cell method.

Keywords: Mean field limit, particle in cell, Poisson bracket, compatible finite elements

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Prof. Dr. R. Klein