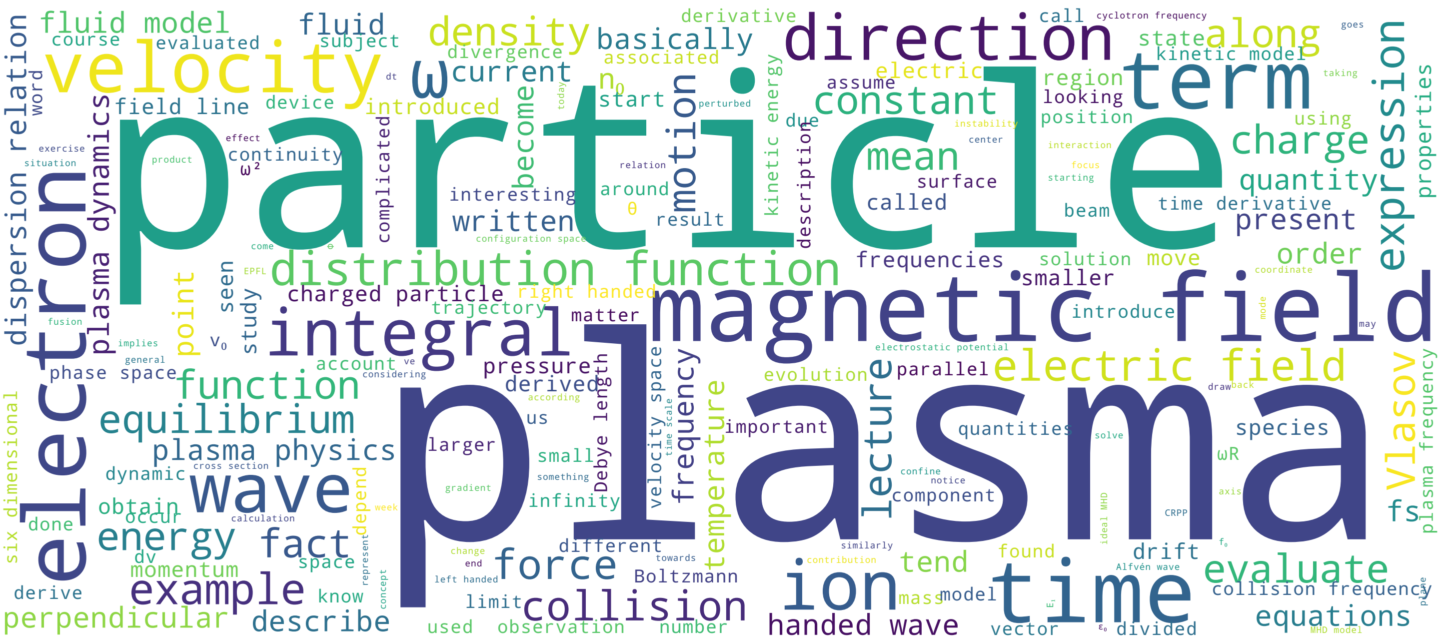
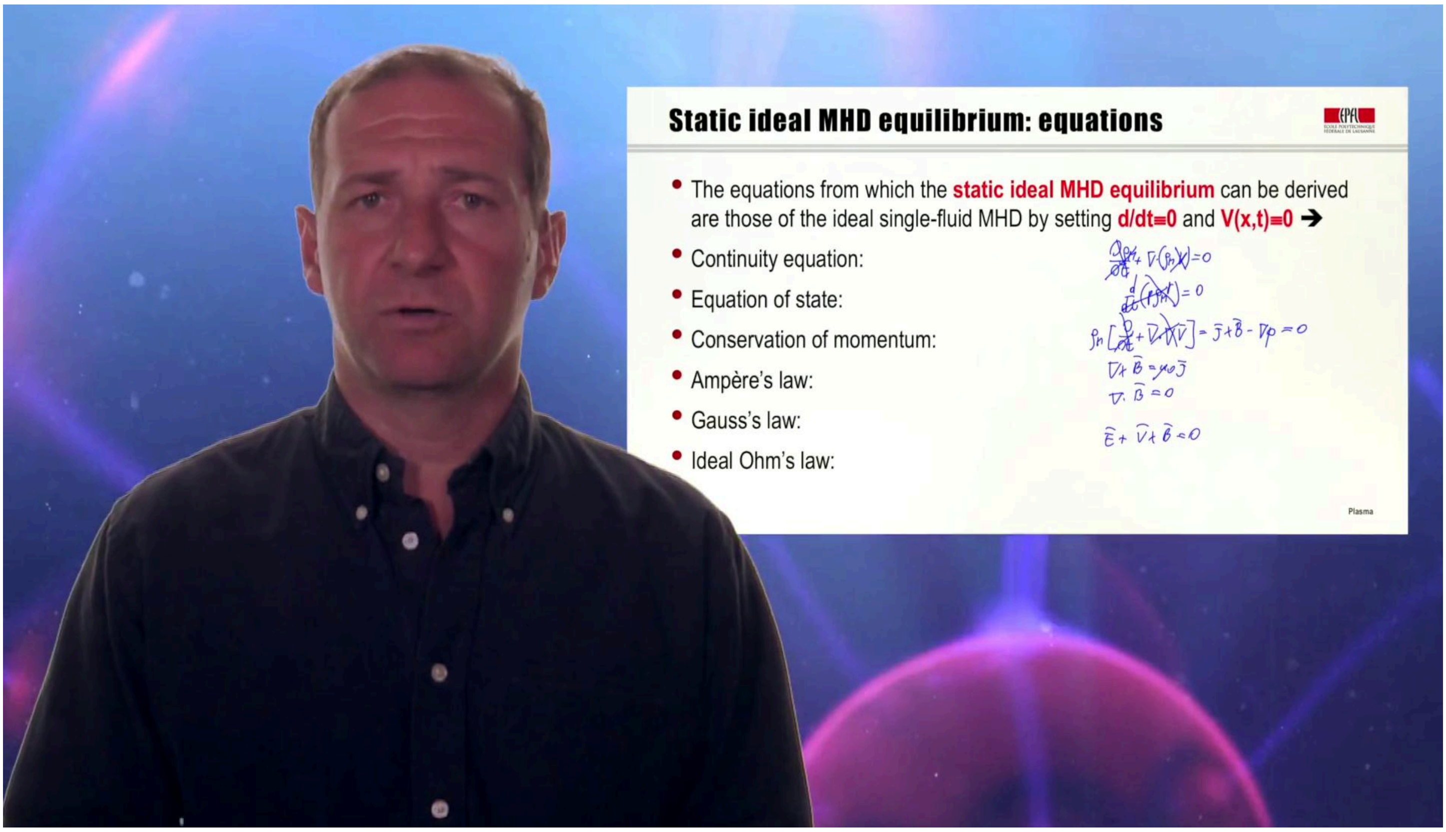


Search MOOC

Video

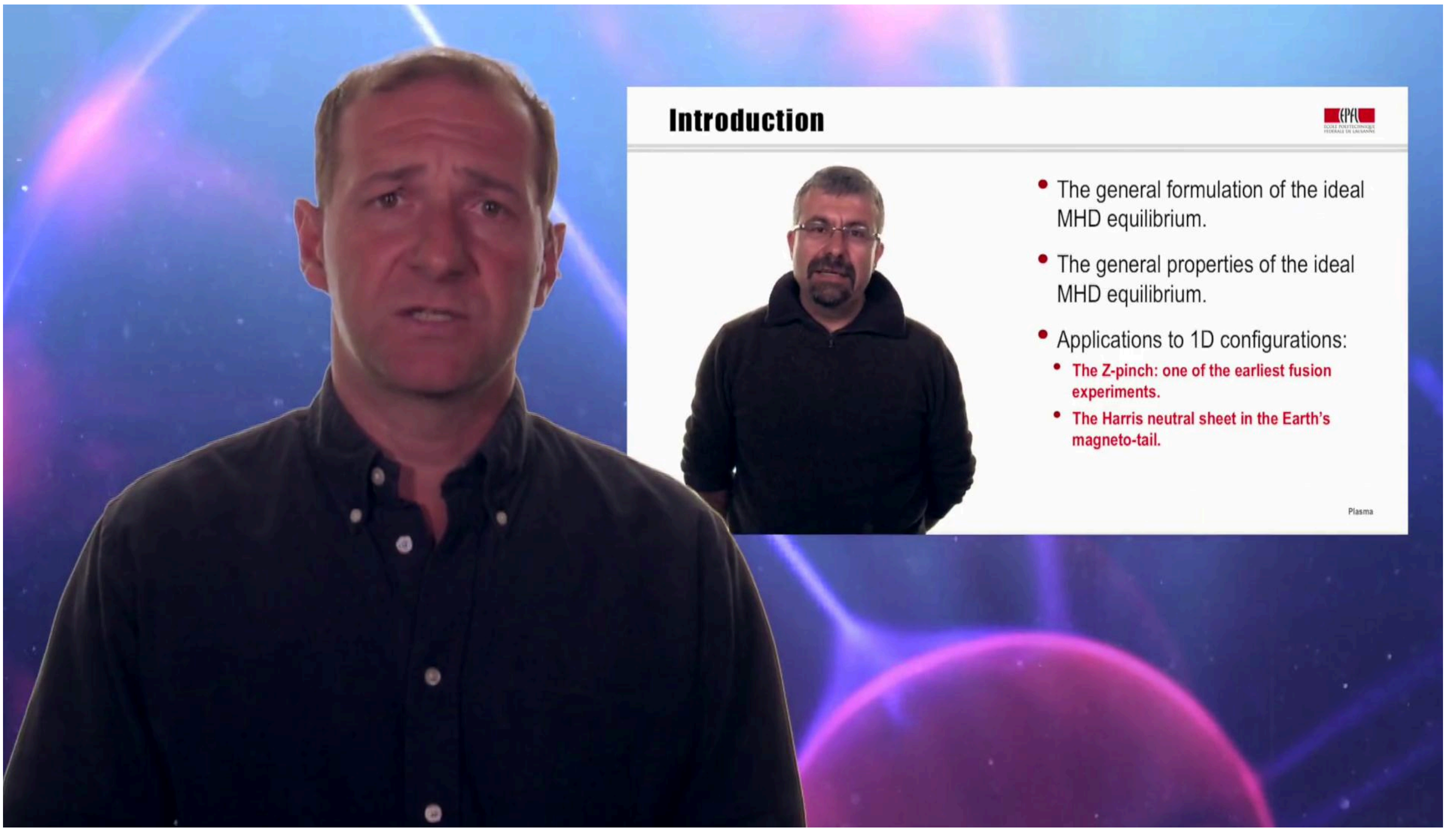


While quite accurate, the kinetic model that has been introduced in lecture 2 is in many cases too complicated, both from the analytical and the numerical point of view, to study the dynamics of a plasma in an actual situation. For this reason, simpler models based on the fluid set of equations have been derived. They have been derived from the kinetic model. These models still constitute today the workhorse for the investigation of plasma dynamics. The advantage of the fluid models is that they have a lower dimensionality. The description of the plasma dynamics passes from being a six-dimensional description to a three-dimensional investigation. This ultimately allows a deeper understanding of the physics model and more accessible plasma simulations. Two models of the plasma dynamics will be presented in this lecture: First, the two-fluid model, which is based on treating electrons and ions as two separate fluids; second, the so-called magnetohydrodynamics or MHD model, which describes the plasma dynamics as the evolution of a single fluid. We will learn how to formally derive both models and we will see some applications focusing on the waves that these models predict.

Notes

Summary

0m 04s



The lecture will span over two weeks and will be given by Professor Paolo Ricci, head of the theory group at CRPP, and by Dr. Duccio Testa, a researcher working at CRPP on the TCV tokamak.

Notes

Summary

1m 13s