

FUSION FuseNet

Calculations in Plasma Physics

Applied to the Fokker–Planck equation solving

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Title: Calculations in Plasma Physics Accuracy vs Speed

Speaker: Jędrzej Walkowiak

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Abstract: Plasma physics is probably one of the most complicated fields to deal with. It involves so many phenomena, that it is extremely difficult, from the computation point of view, to obtain reliable results in a reasonable time. Therefore, without dedicated computation tools it would not be possible to carry on with the fusion project. As unintuitive it might be, sometimes the way to the result which more accurately reflects reality is not by developing more accurate models, but by finding their approximations. The key issue is computation time, which is usually the main constraint on the usability of the model in practical application. There are cases, when reducing the complexity of the models, which allows us to include more phenomena into our computation code. This eventually gives better results than just improving the basic physical model. There is also another level of fast computations, when we try to obtain the results in real time. This grants us certain benefits in magnetic confinement of plasma, but most of the algorithms cannot achieve the required speed. New approaches, like neural networks, can help in solving complicated problems in time scales unattainable before.

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