Institutionen för Rymd-, geo- och miljövetenskap

Thesis projects in numerical methods for integrated tokamak modelling

The Plasma Physics and Fusion Energy group is looking for thesis students, interested in numerical and/or physics aspects of the fusion-reactor-plasmas simulation. You will be analyzing the results and developing components of European Transport Simulator (ETS) – the numerical tool used for integrated modelling of the plasma dynamics in the existing and future fusion plasma experiments in the framework of EUROfusion consortium. In particular, you will be dealing with numerical solvers of partial differential equations (PDEs), which describe the dynamics of the fusion plasma. This includes activities in investigating and improving the performance, accuracy and stability of the numerical solvers in ETS.
Prerequisites: programming skills in a high-level language (Python, Fortran, C++), familiarity and/or interest in numerical methods for solving partial differential equations.

Possible tasks:
1. Analysis of performance and stability of numerical solvers, implemented in ETS, for real plasma scenarios. Development and implementation of the test cases (manufactured solutions).
2. Development and test of the improved numerical scheme (e.g., Runge-Kutta method for time advance in PDEs).

- Målgrupp: teknisk fysik, datateknik, fysik, teknisk matematik, elektroteknik
- Gruppstorlek: 3-4
- Antal grupper: 1
- Handledare: Andrei Osipov `osipov@chalmers.se`
- Examinator: Pär Strand `par.strand@chalmers.se`

Please note that this report can be written in Swedish, and if anyone from TKTFY or TKTEM is in the group the report must be written in Swedish.
OBS: Rapporten kan skrivas på svenska och om någon från TKTFY eller TKTEM är med i gruppen så skall rapporten skrivas på svenska.