Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

A numerical strategy for efficient multi-scale and multi-physics simulations using partitioned coupling[1] NEDA EBRAHIMI POUR, SABINE ROLLER, University of Siegen, Germany — The simulation of complex problems such as multi-scale and multi-physics is still challenging when considering the computational efficiency of those simulations. Simulating all these effects in a single domain is not feasible monolithically, since different scales appear in different areas of the domain, which have to be resolved properly. In order to simulate these kinds of problems in a more efficient way, we make use of partitioned coupling, where we split the domain into subdomains where each of them uses the appropriate set of equations, scheme order and mesh resolution. The subdomains are weakly connected to each other at the boundaries. For the communication and data-exchange between them a coupling approach integrated in our simulation framework APES is used. We will present first results of the coupled scenario and show how well we can reduce the computational cost, when compared to the monolith simulation by means of a small test case, which is still feasible monolithically.

[1]This work was financially supported by the priority program 1648 - Software for Exascale Computing 214 (www.sppexa.de) of the German Research Foundation. The performance measurements were performed on the Supermuc supercomputer at Leibniz Rechenzentrum (LRZ) der Bayerischen Akademie der Wissenschaften. The authors wish to thank for the computing time and the technical support.

Neda Ebrahimi Pour
University of Siegen, Germany

Date submitted: 31 Jul 2019 Electronic form version 1.4