ITER SAFETY STUDIES: DEPLOYMENT OF QUALITY PLAN FOR AINA CODE

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In this contribution, the deployment of Quality Plan for AINA 2.0 Code is outlined. The work has affected both lifecycle model, dependability activities, team layout and tools being employed, yielding finally a new code.

AINA code[1] is a comprehensive hybrid code comprising a global balance plasma dynamics model, which takes some account of profile effects by assuming particular forms for plasma temperature and density, and a radial and poloidal thermal analysis of in-vessel components, by considering separately first wall and divertor modules and performing a thermal analysis for each one in the depth direction. AINA is an evolution of SAFALY code[2], which was initially adopted to assess ITER EDA plasma safety events[3], and is intended to the quantitative investigation of plasma events in nuclear fusion reactors such as ITER.

The new code AINA 2.0 has been benchmarked against the previous version, AINA 1.0, which was employed for the study of several plasma transients included in last version of GSSR[4]. The results show minimal divergences between both codes, which give confidence about previous results (taking into account that the new code was entirely written from scratch). However, the investigation of the different models employed and a sensitivity analysis of the effects of each one over the final plasma-wall equilibrium points to the need of being cautious about some of the results. Further work is needed to improve the validity and robustness of the solution provided by the code.

FEEL-UPC research group has been developing AINA code since 2004[5,6,7,8,9]. FEEL-UPC has been improving it continuously, with new models for plasma wall interactions, blanket thermal analysis, and plasma edge and core.
For the development of the new 2.0 version, AINA development team acquires new capabilities that will allow to improve its performance and work load in the short term. AINA 2.0 code has gained also an improved dependability, which will translate in more reliable results to be used in ITER Safety Studies.

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