### Presentation of M.Veshchunov ISTC Project #3876 (THOMAS)

The progress report on the ISTC Project #3876 (THOMAS) results obtained during 11-12 Quarters is presented.

The work on implementation of the physico-chemical model for U-Zr-O melt oxidation and steel corrosion (as a stand-alone module) into the code CONV2D was finished. Extension of the thermal hydraulic consideration of oxidised melt from small scale (crucible tests) up to a large scale (reactor pressure vessel) and its interaction with the vessel steel walls was launched.

The solution block of an advection-diffusion for oxygen in CONV2D was improved. The adaptation of turbulence model in CONV2D for solving oxygen transport problem in the reactor case was carried out. Modification of the boundary conditions block for oxygen transport in CONV2D code was completed.

The melt-steel oxidation 1-D module was modified, namely additional interlinkage variable, oxygen concentration in the melt bulk near melt-crust boundary, was put in; steel corrosion mode under conditions of a thin crust layer was additionally implemented.

The interfaces of the melt-steel oxidation module and the corium melt 2-D thermo-hydraulic code were modified. Namely, the list of necessary parameters for operation of the modules was enlarged by oxygen concentration in the melt bulk near melt-crust boundary. Oxygen fluxes smoothing, necessary under high turbulence conditions for input to the wall corrosion module, was performed by time averaging procedure between corrosion module callings.

As a result, implementation of the physico-chemical melt oxidation 1-D module in the CONV2D code was completed, and verification of the advanced module and its application to simulation of real experiments has been continued. The preliminary results on convection mixing of oxidised corium in real geometry of the lower head and on corrosion of vessel steel walls were obtained.