



AVVISO DI SEMINARIO

Colloquia per il Calcolo Scientifico

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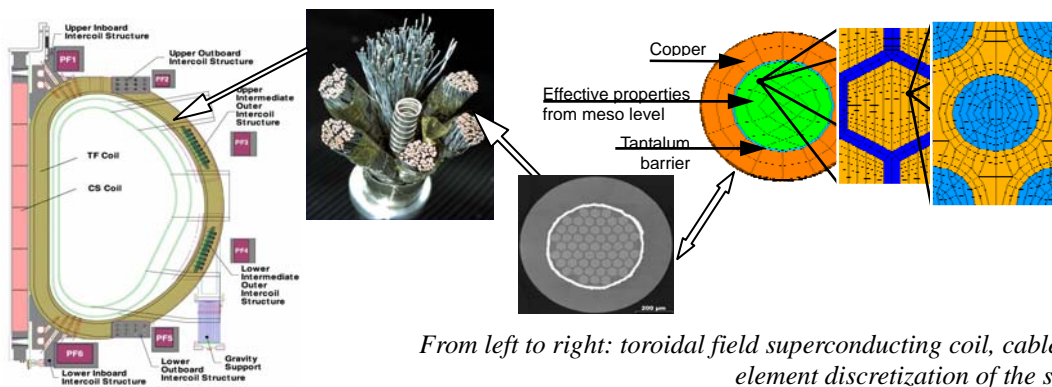
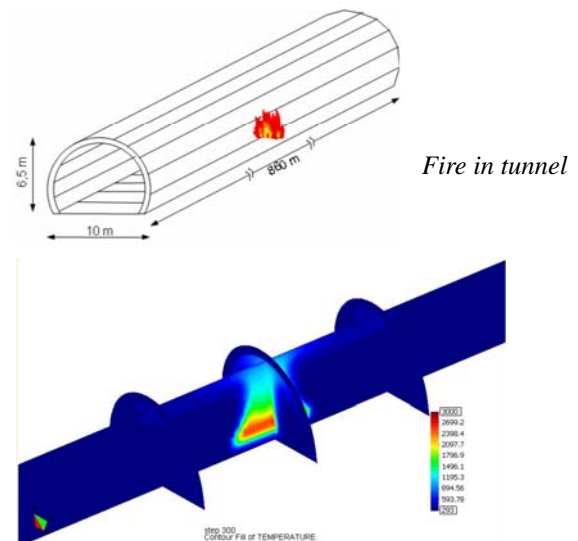
11 maggio 2009, ore 15:00, Aula Magna della Facoltà di Ingegneria
via Loredan 20, Padova

Large scale computation of civil, environmental and material engineering problems

Actual problems of interest in many engineering branches involve either multi physics aspects or multi scale aspects or a combination of both. For their solutions numerical approaches are compulsory and they usually require large scale computation. Here a significant selection of such problems and their solution are shown from the field of civil, environmental and material engineering. In particular for the field of civil engineering a simulation of fire in tunnels is shown, which requires the combination of a multiphase model for concrete for the tunnel lining and a thermally driven flow analyser in the tunnel.

A domain decomposition is used and MPI message passing system to link two appropriate solvers. For the case of environmental engineering subsidence analysis above gas reservoirs is presented which combines both regional aspects as far as flow is concerned and local aspects for the material behaviour of the reservoir rock.

Finally, in the field of materials engineering the thermo-mechanical behaviour of superconducting coils for ITER, the International Thermonuclear Experimental Reactor, now under construction in Cadarache (France), is addressed. In this instance multi scale techniques are used spanning over several scales in the continuum (from microns to millimetres) and a passage to discrete behaviour.



From left to right: toroidal field superconducting coil, cable, strand and finite element discretization of the strand three scales.