DIPARTIMENTO DI GEOSCIENZE

UNIVERSITÀ DEGLI STUDI DI PADOVA

Seminario

Nanostructure and water adsorption in porous materials: the case of concrete and insights from nanopoarticle simulations

Giovedì, 9 novembre 2017 - 16:30
Aula Arduino

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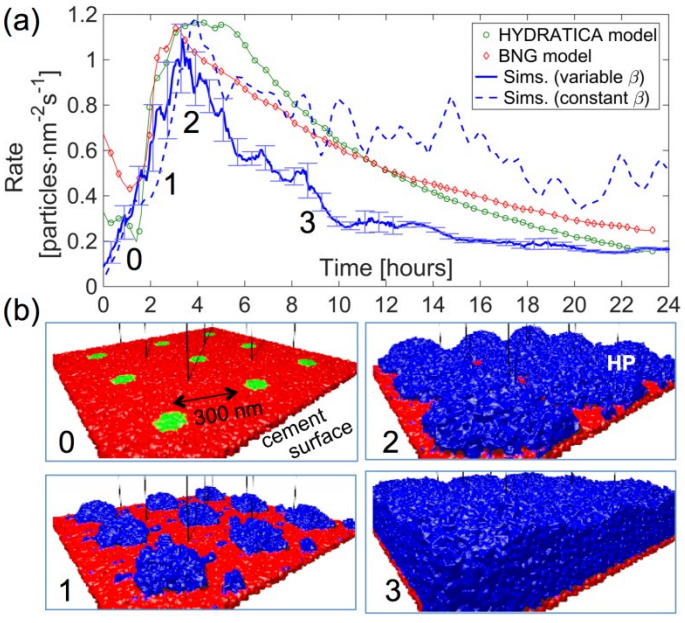
Abstract:
The starting point of this talk is to show that the nanoscale morphology of the cement paste in concrete (and similarly of clays and other mesostructure materials) has a strong impact on macroscopic properties related to the interaction with water, in particular hydration rate, self-desiccation, and water sorption isotherms. Having shown this, some recent advances from nanoparticle-based simulations will be presented, indicating a possible pathway to link chemical formulation with nanoscale morphology evolution (formation and ageing), overall towards a simulation-informed approach to the nano-design of concrete and other mesostructured materials.



Hydration rate of cement paste: predictions from kinetic simulations at the nanoscale compared with results from existing models without sub-micrometre resolution

(*)Enrico Masoero is Lecturer in Structural Engineering at Newcastle University, UK. He obtained his PhD in discrete simulations of progressive collapse of buildings at Politecnico di Torino, Italy (2010). During his postdoc at MIT (2010-2013) his research shifted to the nanoscale of cement hydration, leading to his current focus on the multiscale modelling of morphology development in mesostructured materials, using Kinetic Monte Carlo simulations. Enrico is author of 16 papers in international journals, including Physical Review Letters and PNAS. He is member of the TU1404 COST Action on concrete durability and of the Materials Properties committee of the ASCE's Engineering Mechanics Institute.

Proponente: Luca Valentini