

Abstract:

In this talk, we consider a mathematical model describing micro-swelling of a pocket of water in porous materials. Such topic is relevant in cold regions, where buildings exposed to extremely low temperatures undergo freezing and build ice lenses that lead to the mechanical damage of material. Our goal of this study is to build a macro-micro model for moisture transport suitable for cementitious materials, where at macroscopic level, the transport of moisture follows porous media-like equations, while at microscopic level the moisture is involved in an adsorption-desorption process leading to a local swelling of the pores. In this talk, we propose a one-dimensional microscopic problem describing swelling of a pocket of water on a half-line with a moving boundary at one the ends. We discuss the existence and uniqueness of a solution globally in time for our problem. This is a joint work with Prof. Adrian Muntean (Karlstad University, Sweden).