Contribution ID: **13** Type: **not specified**

The role of impurities in first order phase transitions

Wednesday, 7 December 2022 12:00 (1 hour)

First order phase transitions in cosmology are usually assumed to proceed via bubble nucleation in homogeneous spacetime. However, the presence of impurities, or seeds, in the early Universe can provide an additional (catalyzed) channel for the false vacuum decay with enhanced tunneling probability. In this talk we will show how this picture can be realized already in the simplest extension of the SM including a scalar singlet with Z_2 symmetry (xSM), in the case of a two-step electroweak phase transition. The role of impurities is here played by the Z_2 domain walls. We will discuss the various methods and approximations that allow us to evaluate the catalyzed nucleation rate, and show that this is generically faster than the homogeneous one. We will finally comment on the impact of a seeded phase transition in terms of the expected gravitational wave signal.

Presenter: Dr SIMONE BLASI (Vrije University)