Thermodynamic stability of braneworld Einstein-Gauss-Bonnet solutions and vacuum bubbles

In this talk we address the thermodynamic stability of braneworld cosmological solutions of five-dimensional Einstein-Gauss-Bonnet gravity. This is particularly important in settings where more than one classical solution is allowed, as in the case of splitting vacuum thin shells analysed in Ref. [Class. Quantum Grav. 35 085004 (2018)] that represent either an ephemeral or a branch-changing false vacuum bubble spontaneously emerging from the brane. We compute the free energy associated with the competing solutions and find a non-trivial criterion to decide among them. These results strengthen the relevance of the solutions found in that reference by proving that they are thermodynamically preferred for certain parameters.