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Mr. NO, Jose Miguel Postdoc (CEA Saclay): Bubble growth and energy budget in cosmological first order phase transitions

Monday, 13 September 2010 15:00 (15 minutes)

A cosmological first order phase transition can lead to many interesting phenomena, such as electroweak baryogenesis, primordial magnetic fields, or the production of a stochastic background of gravitational waves. All of them rely on the phase transition proceeding through the nucleation and subsequent expansion of bubbles, and apart from the quantities that describe the phase transition itself, there are other quantities that become relevant for describing these phenomena, such as the velocity of the expanding bubbles or the efficiency coefficients for converting the available free energy of the Higgs field into fluid bulk motion, thermal energy and gradient/kinetic energy of the Higgs field. Here We review the hydrodynamic treatment used to describe the fluid motion once bubbles start growing, and go on to obtain the energy conversion efficiency coefficients. We also study the recent possibility of having continuosly accelerating (runaway) bubbles, and how their existence modifies previous studies on bubble growth.

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