

## Can dark matter be responsible to save the Universe?

The recent discovery of the Higgs boson at the Large Hadron Collider at CERN has made the fundamental particles even more interesting, completing the quest for discovering all particles embodied in the standard model (SM) of particle physics. However, the measured Higgs mass indicates that the Universe is resting in a metastable vacuum, waiting to make a transition to a much deeper vacuum in a distant future, if SM is valid up to the Planck scale. Such a transition will release an enormous amount of energy and destroy the present Universe. However, several astrophysical evidences of existence of dark matter suggest SM needs extension. At IIT Indore, Najimuddin Khan and Subhendu Rakshit have explored the idea that dark matter can help save the Universe from such a horrendous fate. Citing the example of two popular models of dark matter, where, the dark matter consists of scalar particles arising from extending SM by a gauge singlet or doublet scalars, the authors examined the parameter space of these models that imply stability of the Universe and explain the observed relic abundance of dark matter as well. The results were published in two Physical Review D research articles.

Links to the articles:

1. <http://journals.aps.org/prd/abstract/10.1103/PhysRevD.90.113008>
2. <http://journals.aps.org/prd/abstract/10.1103/PhysRevD.92.055006>

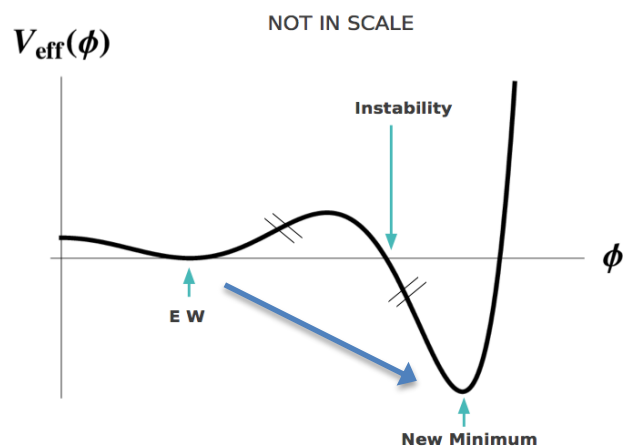


Fig 1: Transition from present electroweak (EW) vacuum to a deeper vacuum

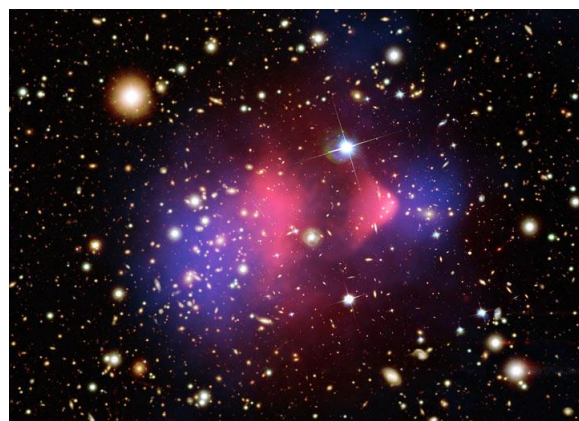


Fig 2: Evidence of dark matter from observations of the bullet cluster  
Courtesy: [www.nasa.gov](http://www.nasa.gov)