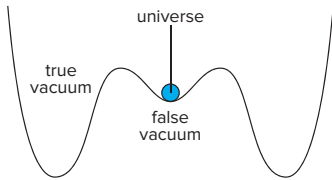


The Inflationary Multiverse

Inflation may start and end at different times and places, creating a multiverse of parallel neighboring cosmoses. String theory suggests these universes may have different properties, laws and even dimensions.

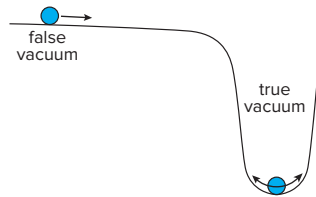
Old Inflation

(a) While the universe is nestled in the higher-energy 'false vacuum' state, it inflates, expanding at an exponential rate. Inflation only ends when the universe is in the true vacuum. But how can it reach there?



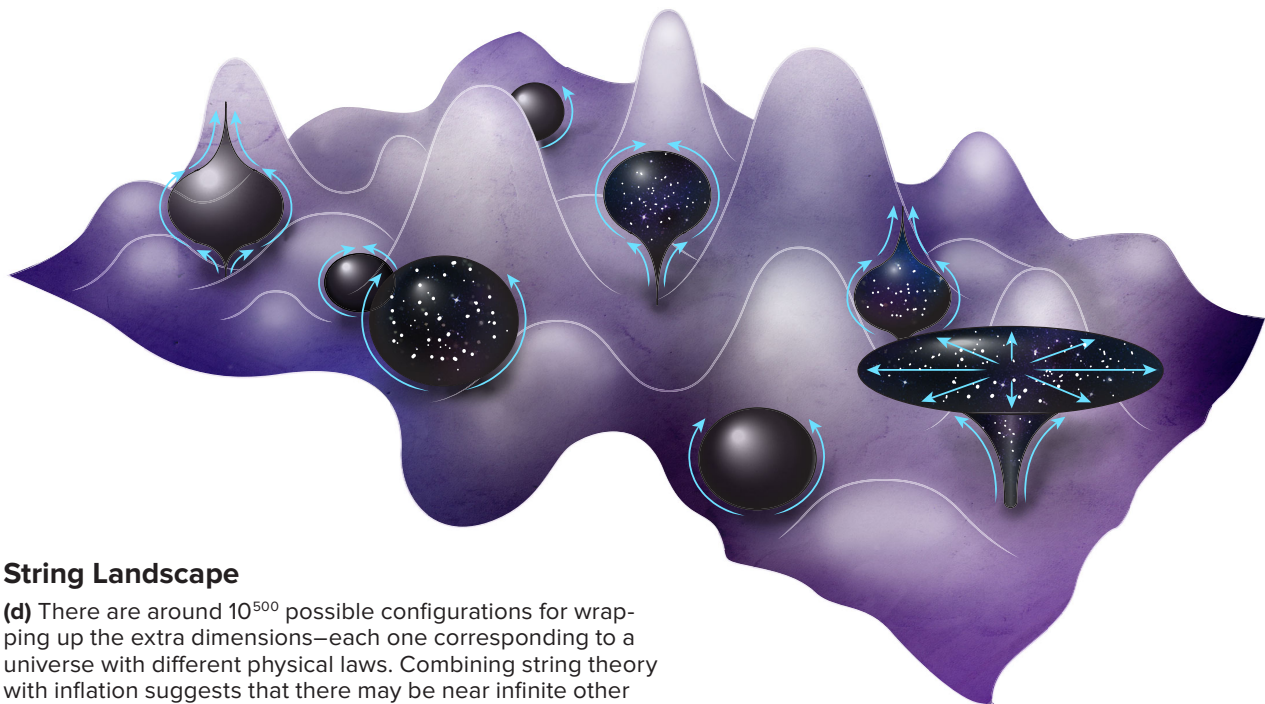
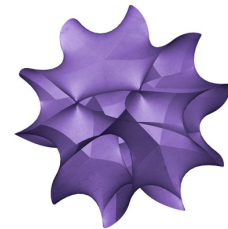
New 'Slow-Roll' Inflation

(b) The false vacuum is represented by a shallow incline. As the universe slowly rolls down, it continues to inflate. Inflation ends when it hits the true vacuum, rolling back and forth in the valley, releasing energy to create new particles.



Extra Dimensions

(c) String theory predicts there are a number of extra dimensions, hidden from us because they are small and curled up in complex ways. The image shows a 2-dimensional slice of one such proposed 6-dimensional folding pattern.



String Landscape

(d) There are around 10^{500} possible configurations for wrapping up the extra dimensions—each one corresponding to a universe with different physical laws. Combining string theory with inflation suggests that there may be near infinite other universes, generated by inflation, and populated with different parameters, forces and dimensions by string theory. Only very rarely will one be produced that has the right parameters for stars, galaxies, planets and people to evolve.