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88 YEARS OLD AND STILL DELVING LIFE'S MYSTERIES. . . ; BEACHCOMBER

July 13, 2005

SPAGHETTI and doughnuts, I have always thought, do not go well together, especially when one is feasting on roast beef, but chatting with Lisa Randall at lunch the other day at Simpsons in the Strand, everything in the universe suddenly seemed to fall into place.

Professor Randall is the author of *Warped Passages* (Allen Lane, £25) which tackles the daunting problem of explaining how the world works. Stephen Hawking tried the same thing in his *Brief History of Time*, but no reliable accounts have yet been reported of any sighting of a reader beyond page 47.

Roger Penrose made another brave effort to explain it in his *Road To Reality* (one of the few in the 'Road To' series without Bing Crosby or Bob Hope) but frightened off most readers by page xix of the preface.

Lisa Randall, however, achieves the near impossible feat of explaining complex ideas in simple language without descending into banality and over-simplification.

Until 100 years ago, there was no problem about how the world worked. We all lived in a simple three-dimensional space, where everything was made of atoms and atoms were made of electrons buzzing around a nucleus. In 1905, however, Einstein began the process of shattering this cosy view of the world with his *Special Theory of Relativity* in which matter and energy became interchangeable, time and space became inextricably confused, and our cosy three-dimensional world became a four-dimensional space-time continuum.

Since then, things have grown far worse.

The atom was prised apart, spilling out a panoply of new fundamental particles called quarks, which could be up quarks or down quarks. Then strange quarks and charm quarks joined them, and holes in the theory were plugged with muons and leptons and bosons and the brilliantly-named gluon, which sticks things together. Behind all this was Quantum Theory, which produced such paradoxes as particles in two different places at the same time and a cat that was simultaneously alive and dead. All the science fiction tosh about parallel universes developed from these ideas, and the basic ideas of physics slipped further and further away from the concerns of ordinary folk.

Finally, just to make sure that science fact was even stranger than science fiction, physicists came up with the idea of String Theory, and then Superstrings, which replaced all the fundamental particles with buzzing squiggles of energy called strings, which lay at the heart of everything.

Well, more than everything, actually, because superstrings are not confined to our three-dimensional world, or even Einstein's four-dimensional spacetime continuum, but are squiggles from a ten or eleven dimensional space of which our world is just a small slice. Munching her way impressively through a generous portion of roast beef, Prof Randall explained it all to me. Why do time and mass and space come in tiny units governed by Planck's constant? Because there's a

tiny thread of four-dimensional spaghetti quanta have to leap over to get from one place to another.

Or there may be two tiny dimensions curled up in a minuscule doughnut at every point in space. Ten dimensions? Eleven dimensions? It doesn't matter which is true, or even if 'true' means anything any more.

But Superstring theory explains everything and Lisa Randall explains Superstring theory.

A doughnut at every point in space. Now there's a theory that would gain Homer Simpson's vote.

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