



Gravity Seminar

Title: "An Exceptionally Simple Theory of Everything"... explained (part I)

Speaker: Paul Watts [UCD]

Date: Fri 4th April 2008 at 3:30PM

Location: CASL Seminar Room - Belfield Office Park

Abstract: Last November, self-described "surfer dude" Garrett Lisi came out with the punnily-titled paper "An Exceptionally Simple Theory of Everything", in which he presented a model that he claims unifies all four forces, including gravity, into a theory with an E_8 group symmetry. Here's the link:

<http://arxiv.org/pdf/0711.0770>

I'll be giving two (very informal) talks on this paper: this Friday, I'll give a presentation on root systems, Lie algebras and representations, a quick'n'dirty pedagogical introduction to (hopefully) most of the concepts needed to understand Lisi's paper. It'll be pitched at a fairly introductory level: I'll assume that the audience has a 4th-year undergraduate/1st-year postgraduate-level notion of what vector spaces, groups, algebras, etc. are, but not much more. Here are a few relevant textbooks that might be useful:

* Robert Gilmore, "Lie Groups, Lie Algebras and Some of Their Representations" (Wiley, 1974) This comprehensive and well-written book is an excellent introduction to the subject for a mathematically-inclined physicist (or a physics-inclined mathematician).

* Howard Georgi, "Lie Algebras in Particle Physics" (Benjamin-Cummings, 1982) * Robert N. Cahn, "Semi-Simple Lie Algebras and Their Representations" (Benjamin-Cummings, 1984) These two classic texts in the Frontiers of Physics series approach the subject from a more phenomenological direction, specifically looking at how Lie algebras appear and are used in the context of particle physics.

* Nathan Jacobson, "Lie Algebras" (Interscience, 1962) This is a full-on mathematics book, so it might be a bit too much for some people. However, it's very good and covers in depth a lot of the details us physicists prefer to wave our hands over.

All of these books are available from Amazon (most quite reasonably-priced if you get the Dover paperback editions), and all but the Cahn book are in the UCD Library.

Then, two weeks later (April 18th), I'll use all that background info in trying to figure out what exactly Lisi's on about in his actual paper. More details on that closer to the date...

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