

Why should the average person care whether we discover the Higgs boson?

“What on Earth is a Higgs boson when it’s home for supper?” exclaimed my father in his thick Lancashire accent.

We were hiking in the Lake District and I had just spent the last twenty-five minutes of a steep ascent trying to explain to him what they are actually doing at CERN, or “the-place-where-they’re-going-to-end-the-world” as he likes to call it.

I was starting to lose my patience.

“Higgs boson? It sounds like a dance from the forties,” he said.

At this point, exasperated, I was ready to give up.

Although...the Lindy Hop...the Box Charleston...the Higgs boson – perhaps he had a point?

So, why should the average person care whether we discover the Higgs boson? Why should my father – a man with a known penchant for reading the Daily Mail and telling me about how “society’s going to the dogs” these days – care one iota about fundamental physics research?

Well, I could tell you that research at CERN has led to new cancer treatment therapies. I could tell you that it has led to major developments in MRI scanning, or advancements in semi-conductors, or improved methods for the incineration of nuclear waste. I could even tell you that work at CERN led directly to the invention of the Worldwide Web. But that would be too easy.

In a way I can appreciate the pragmatic appeal of arguments such as these: it is undoubtedly true that fundamental research almost inevitably leads to useful spin-off technologies. Yet, such arguments somehow seem to debase science. They effectively reduce science to the level of a commodity, with a value determined by the free market.

Such arguments were surely useful during last October’s ‘Science is Vital’ campaign, in which thousands of scientists took to the streets of London to convince the Government to spare UK science from the cuts. And, on the whole, these arguments worked. The UK science budget was frozen in cash terms – a far better outcome than had been feared following indications from Vince Cable that the cuts to the science budget could potentially be as high as twenty-five per cent.

Nevertheless, I can’t help thinking that the victory – while perhaps more difficult to achieve – would have been all the sweeter had it been won through arguments made on the basis of ‘science for science’s sake’. Of course, I appreciate the necessity for campaigners to speak the language of Whitehall in emphasising the benefits science brings to the UK economy. But in relying almost exclusively upon such arguments, the scientific community seems to have tacitly agreed that science’s sole *raison d’être* is the generation of revenue for the national economy.

So, should the average person only care about the potential financial benefits the discovery of the Higgs boson may bring? And thus, by extension, should a European be rooting for the particle to be discovered at CERN, rather than at a competing particle accelerator elsewhere in the world?

Yet, there are much grander, idealistic reasons for concerning oneself with such fundamental research. The discovery of the Higgs boson would be the final piece of the puzzle in completing the standard model and would have huge implications for our understanding of why certain particles have mass. The standard model is the key to unifying two of the four fundamental forces thought to exist in the universe, namely 'the weak force' and 'the electromagnetic force'. This implies that electricity, magnetism, light and some types of radioactivity are, in fact, all manifestations of a single underlying force dubbed 'the electroweak force'. Of course, should the Higgs boson not be found, this would also have fundamental implications: it would leave the standard model dead in the water. Physicists would then have to develop whole new theories, or would have to turn to one of the range of so-called 'Higgsless models' currently available, such as those based on technicolor, those which invoke the existence of extra dimensions, or even other, yet stranger, theories.

All of this may sound terribly complicated – and it is, even in the superficial, maths-free form in which it has been presented here. Yet, instead of shying away from this complexity, as popularisers of science so often do, ought we not embrace this complexity and rejoice in it? Instead of retreating and simply listing the tired old list of technological developments that 'blue skies' scientific research has yielded in the past, ought we not celebrate the way in which the existence (or non-existence for that matter) of the Higgs boson has the power to cause a fundamental change in our collective *Weltanschauung*. It is because of this power that we, as an enlightened society, have an essential moral and ethical duty to conduct such fundamental research as this.

We should certainly all care about whether the Higgs boson exists, but there's one thing we should care about even more: the fact that such fundamental research continues to be funded and is recognised as the public good it truly is. At least, that's what I told my father as we tucked into our sandwiches at the top of the mountain.

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