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LET'S GET QUANTUM PHYSICAL

Whether you are trying to explore the universe, which is very, very big, or the 'quantum realm', in which particles of light and matter are very, very small, nothing can be stated with clearer conviction than this: nobody understands what's going on. The world's greatest physicists have openly admitted this for more than 100 years. So, if you've ever lamented your own incomprehension, let yourself off the hook immediately. Welcome to a bluffer's paradise, where no one need be afraid, nor should anyone feel stupid.

Of course, where physicists do have knowledge and understanding, prudence dictates that astute bluffers gain some appreciation of it. This will not be too difficult. The universe is, after all, very large, and its smallest entities are extremely small – and their conduct is unusual, to say the least.

Happily, such an appreciation may be obtained

without formulae, equations or fractions. It may seem to be taking the word 'appreciation' too far, but you are going to have to feign, find or affirm some sense of wonder. Nature is full of marvels at the best of times. In the quantum realm, as the great Danish physicist, Niels Bohr, used to say: if people didn't find these phenomena baffling, wild and shocking they weren't taking it in. At the end of this book, you might agree that Bohr was understating things a bit.

Inevitably, overwhelming questions will keep coming up. Nowadays such questions can neatly be batted away with the words: 'Yes, well, of course they're looking into that at Cern.' You hint at deeper knowledge by saying that Cern is an acronym for Conseil Européen pour la Recherche Nucléaire and by being specific about the actual location of the famous 'collider' – near Geneva, beneath the Franco-Swiss border. (Not too far away from Goldfinger's lair in the eponymous Bond book, actually.)

Mentioning Cern will become an automatic response for you, and one that falls somewhere between 'They deal with that in accounts', 'My mother-in-law will know' and 'Give the ball to Brian,' No one should ever tire of saying, 'Yes, they're addressing that at Cern.'

Nothing conveys the impression of substantial intellect so much as even the sketchiest knowledge of quantum physics, and since the sketchiest knowledge is all anyone will ever have, never be shy of holding forth with bags of authority about subatomic particles and the quantum realm without having done any science whatsoever.

After all, what else is the act of bluffing about?

It won't do any harm, however, to have a tangential grasp of your new area of expertise. The word 'quantum', as you will see, refers to tiny entities, originally units of energy. A quantum is an amount – the word has the same root as 'quantity'.

And 'mechanics' is the branch of mathematics which deals with motion and the forces which produce motion. 'Quantum mechanics' has absolutely nothing grease monkey-ish about it. That's it in a nutshell.

This book sets out to guide you through the main danger zones encountered in discussions about the quantum universe. It also equips the dedicated bluffer with a vocabulary and a range of evasive techniques that will minimise the risk of being rumbled. It will lend you a few easy-to-learn hints and methods that will allow you to be accepted as a physics expert of rare ability and experience. But it will do more. It will give you the tools to impress legions of marvelling listeners with your knowledge and insight – without anyone discovering that before reading it you didn't know the difference between a boson and a fermion or a meson, or come to that a photon, pion or gluon.

However tempting, try to avoid anything like 'dreamon', carryon, whatson, or admit that you're 'puttingiton'. And try not to misspell or mispronounce 'hadron'.

Bluffers are smarter than this (especially when they're engaged in a good bluffon).

Meanwhile, the boffins are carrying on their work, largely unknown and uncelebrated (apart from the odd Nobel prize).

Physicists, like all scientists, are supposed to do