

# Behimd Closed Doors

## -Quantum Computing with Winni, Rock god and Physics legend.

We have all heard of quantum physics and to a greater or lesser extent have some feeling for the reality behind the soundbites, but what does a quantum physics researcher actually get up to?

Well at Sussex uni we are privileged to have the outgoing and super-smart Winfried Hensinger, senior lecturer in physics and the man to build the world's first large quantum computer! I had the pleasure in speaking to Winni about his work and how he deals with the mysteries of Quantum Physics.

We begun by talking about the day-job and I really get the impression Winni is not just doing this for a job but because he enjoys it,

"Basically what we do is trap ions using laser cooling so we can hold them in ion traps." Winni explains how once you have the ability to manipulate ions (atoms with non-zero charge) then you can treat them as "quantum bits" much like a classical computer uses electrical currents to represent bits. The key is however that these quantum bits give you much more for your money than classical bits, "Whereas with two classical bits you have only one of four possible states, either 0-0, 0-1, 1-0 or 1-1, the quantum bits can be in a superposition of all of those states at once." The importance of this fact may not be immediately obvious bu it leads to the following conclusion, "for certain problems, the processing power Cont. On Page 9



## Issue 2

### 01.12.08



"Good morning, and welcome to The Wonders of Physics."

# DJC Budget 2008/9

Following the successful spending of the 2007/08 budget the Departmental Joint Committee (DJC) has been allocated £10,000 for the academic year 2008/09 to spend on improving student experience. Following a number of meetings, the DJC has come up with a budget plan which can be found on the notice board in the Physics library. In summary, the money will be spent on the following:

- •£2000 on buying more course books for the Physics library
- •£1500 on subsidising travel costs to job/PhD interviews
- •£1000 on the Physics ball
- •£1500 will go towards events as well as fixed assets
- •£2500 on redesigning the front grass area of Pev 2
- •£500 on further improving

the kitchen next to Pev 2 foyer

•£1000 will be kept as reserves and are to be spent on emerging items throughout the academic year

The DJC is thrilled to get the opportunity to further improve student experience and all members are very enthusiastic about implementing this plan.

Seb Weidt

Inside this issue:	
New Q-Soc committee members	2
Thorpe Park	3
Camping	4
Pub Crawl 1/Gossip	5
Poker	6
Pub Crawl 2	7
Department News	8
Behind Closed Doors	9
Dead poet's Society	10

Cont. From Page 1... of a quantum computer scales exponentially faster than that of a classical computer. "

We spend the next few minutes talking about what this will mean to you and me in terms of how computers will affect our lives in the future and Winni raises an important historical point, "back in the forties it was widely believed that 'the worldwide market for computers will

be no more than 10' so what effect quantum computers will have is, ...who knows? " In an obvious way quantum computing appears to be able to remove the limits on current research projects, ranging from simulations of large scale cosmic structure to a better understanding of chemical reactions. The problem for such simulations is that the more detail you put in the more accurate the results but the time

taken will be longer. Winni is making it clear that as well as removing these limits quantum computing will also have the power to change the world around us in ways we can't imagine!

Before getting too carried away with the possibilities I wanted to know why don't I have a quantum computer on my desk right now? After all people have been working on these for 20 years or more, since Richard Feynman first worked on the theoretical side, how sure

can we be that a quantum computer will ever grace our desktops? Once more Winni's infectious confidence comes through, "Oh for sure, in ten years they will be available for universities. Fully funcrepeat that last point just to be sure and ask for any limiting factors, "it just needs to be made bigger, but it works as it is meant to." Could funding be a problem? "Sufficient funding is highly important, especially if we want to build one of these machines soon. Only recently I have been awarded of 1.4 million for this research, so we are in a pretty good position here at Sussex."

Moving away from the

practical I ask how seriously Winni takes the phi-

losophical implications,

you know is the cat dead

or alive and all that? "It's

pretty cool to be able to

develop new technology

and think about the very nature of things at the

comment Winni pulls one

of his 'big grin' faces and I

get the feeling you would-

this man to come to work.

"We were watching this

n't actually need to pay

same time." With that

Microchip that is used to trap individual charged atoms which make up the quantum bits.

atom some time ago and it went forwards and backwards at the same time!", What literally? I ask,

"absolutely, that's pretty cool eh?" Yeah, pretty cool sums it up.

If this has whetted your appetite and you want to read more about Winni's work then check out his web page which is full of details of just what it is Winni and his colleagues are up to:

http:// www.sussex.ac.uk/ physics/iqt/index.html

Lasers & Optics required to cool single charged atoms close to absolute zero. (~-273°C)



sn73@sussex.ac.uk and it'll be in the next mag! -if its