

Nanotechnology: $\Delta(\text{Pros}) \Delta(\text{Cons}) \geq \hbar/2$

Well, now that I got your attention with my catchy title, I should explain what I mean!

As I am surfing the web to upgrade the various sections of this newsletter, I am pleased to see that there is a lot of interest in the fields of nanoscience and nanotechnology. For instance, more courses are being developed at the undergraduate and graduate levels all around the world. Also, a wide range of articles about the latest discoveries in nanomaterials are appearing in the most widely read newspapers and nearly monthly additions are being made to highly specialized journals. On the other hand, more and more concerns are being raised about the potential hazards linked to the development of new nanotechnologies. So, yes, the number of people from both camps is large enough that we can start calculating the standard deviation of their opinion (back to politics as always) and definitely, pros and cons do not commute! This explains my title. How about the \hbar ?

Well, we definitely do not want to take the classical limit and equate the product of the two “delta”s to zero! For starters, it would be so “non nano” and it would imply that one of the two camps has won. Who wants to be in the other camp at that point? Let the uncertainty prevail for a while, hoping that everyone will start taking a deep breath and a cold shower.

Having worked in the field of nanoelectronics for close to 20 years, it is obvious where my loyalty is. For instance, with the help of other faculty members at the University of Cincinnati (UC), I have developed a class which is an introduction to the field of quantum computing. We will teach it for the third time this winter. Now, I admit that quantum computing is one of the most esoteric areas of research, but it is definitely about as exciting as it must have been for scientists and engineers when the new quantum mechanics was developed in the mid-1920s. Personally, I find the area of quantum computing a nice platform to teach the field of quantum mechanics to people who would shy away from an area thought to be only reserved for physicists. In the introductory class we teach at UC, we had an enrollment of about 30 students including students from electrical and computer engineering, computing science, aerospace and materials engineering, and also from the math department. That is the beauty of it! Nano is a field which is developing so quickly that it requires people to interact and form interdisciplinary teams to tackle really intricate problems. In an era where people seem to progressively isolate themselves with all their electronic gadgets, we should embrace the field of nanotechnology. That can get us communicating more with each other.

Being enthusiastic about the field, I also want to tip my hat to the people who started raising concerns about the potential hazards of any new nano-based technologies. Of paramount importance is ethical behavior, which means concerns for the well being of all humans. That is why this newsletter will be as fair as possible in providing links to both pros and cons.

I hope you will find the new links I have included in the subsections of the newsletter useful. I would like to thank all the people who provided some valuable info to include in those links. That number is growing and this means more of you are reading the newsletter! However, my webpage has a counter which has only reached a few hundred to date so I am counting on you to pass the website address for this newsletter to as many friends and colleagues as possible. I would like to see the counter closer to a few thousand when someone else will take over as the editor a year from now.

I thank you in advance for your collaboration and I wish all of you a very nice holiday season and plenty of success in 2007.

Sincerely yours,
Marc Cahay

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