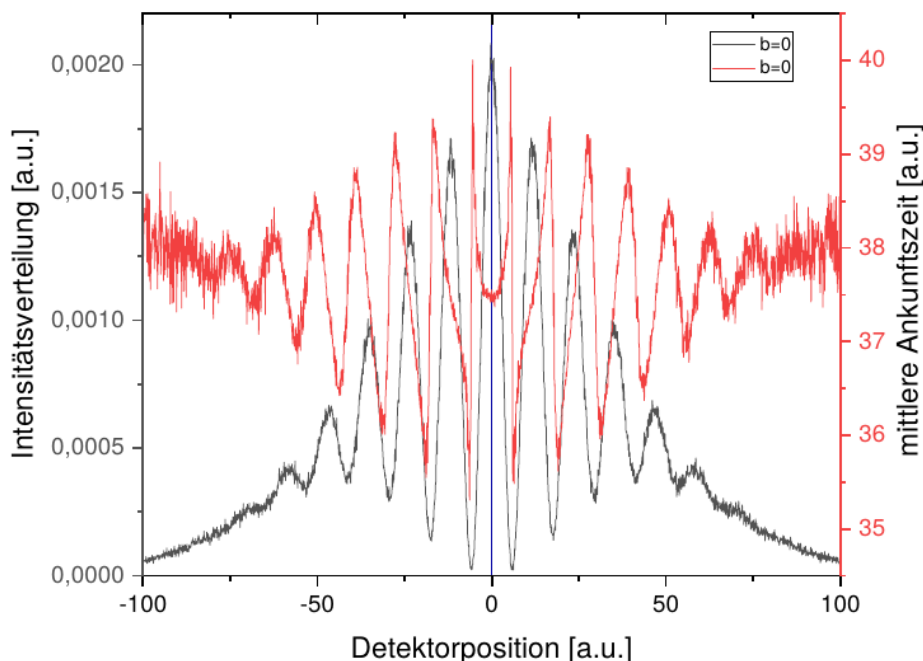




Shut up and Calculate!

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In an article in Physics Today in 1989 David Mermin wrote:

“If I were forced to sum up in one sentence what the Copenhagen interpretation says to me, it would be: ‘Shut up and Calculate!’”

While quantum mechanics (and I will restrict myself to non-relativistic QM in my talk) has been tremendously successful in calculating properties of the atomic and sub-atomic world, we are still debating about what it all means, almost 100 years after Schrödinger derived his equation as the Hamilton-Jacobi formulation of quantum mechanics.

I will argue in my talk, that these interpretation problems arise if we follow the Copenhagen dictum that the Schrödinger equation is **the** and not **one** complete description of quantum mechanics. I will present an approach going back to E. Nelson in 1966 treating quantum systems as intrinsically open systems. The approach has been developed by now into what one can call quantum analytical mechanics. This change in perspective leads to new insights as well as new things one can calculate and old things one can calculate better.

So it pays off to also read the next sentence of Mermin’s quote: *“But I won’t shut up.”*