



## Joint MaPhySto - QUANTOP Seminar

**Speaker:** Professor Reinhard Werner, Institute for Mathematical Physics, TU-Braunschweig, Germany

**Title:** A proof of Heisenberg's first uncertainty relation

**Time:** Friday, October 31<sup>st</sup> at 13:15

**Place:** Fysisk Auditorium

### Abstract:

In his famous 1927 paper, Heisenberg introduces two quite distinct aspects of quantum uncertainty. First, the impossibility of performing a precise joint measurement of canonically conjugate observables and second the impossibility of preparing states, in which two conjugate observables both have sharp distributions. While a rigorous statement of the second aspect has become basic textbook material, the first aspect is usually treated only by qualitative discussion. Here we prove a completely general inequality  $(\Delta P)(\Delta Q) \geq C\hbar$ , with a precise definition of the  $\Delta$  quantities, expressing the constraint on joint or successive measurements of  $Q$  and  $P$ , and determine the optimal constant  $C$ .

Ole Barndorff-Nielsen and Klaus Mølmer

### Announcement:

Professor Werner is in Aarhus in connection with the annual meeting of the Danish Alexander von Humboldt club, and Friday afternoon at 16.00 he will present a public lecture entitled

‘Are Quantum Computers the Next Generation of Supercomputers?’.

The public talk will take place in Auditorium 3, Søauditoriehuset, and it will be concluded with refreshments at the Steno Museum. Free entrance.