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# WE ARE ALL QUANTUM MADE

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Bonnie Qian

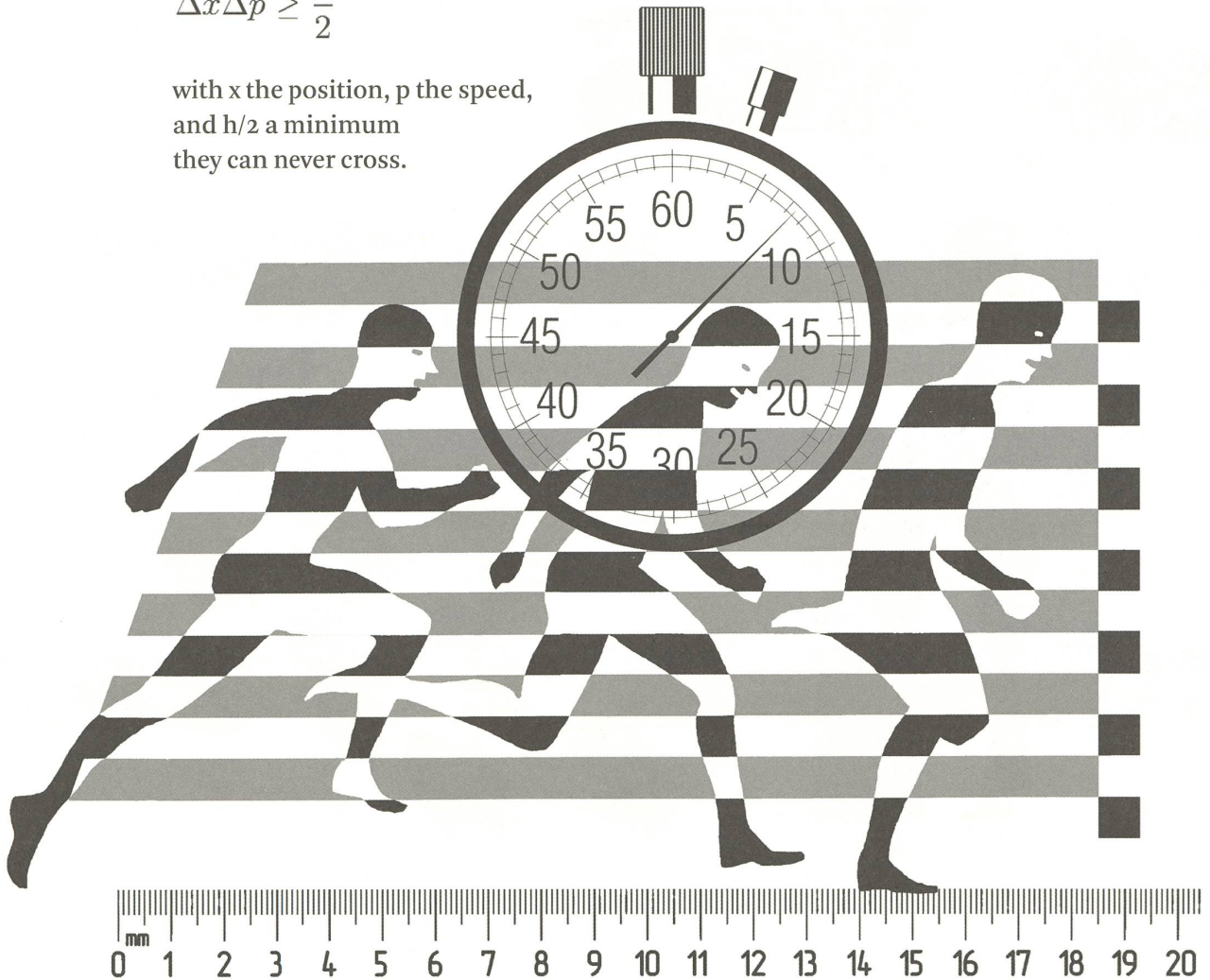
## THE CAMELEON PARTICLE

There is a famous law in quantum physics that says, one cannot «both» know the position and the speed of a particle. At least not to the same accuracy.<sup>1</sup>

If you are lucky enough to measure with great precision its «change in position», then you cannot precisely determine its «change in speed». And vice versa.

$$\Delta x \Delta p \geq \frac{\hbar}{2}$$

with x the position, p the speed,  
and  $\hbar/2$  a minimum  
they can never cross.



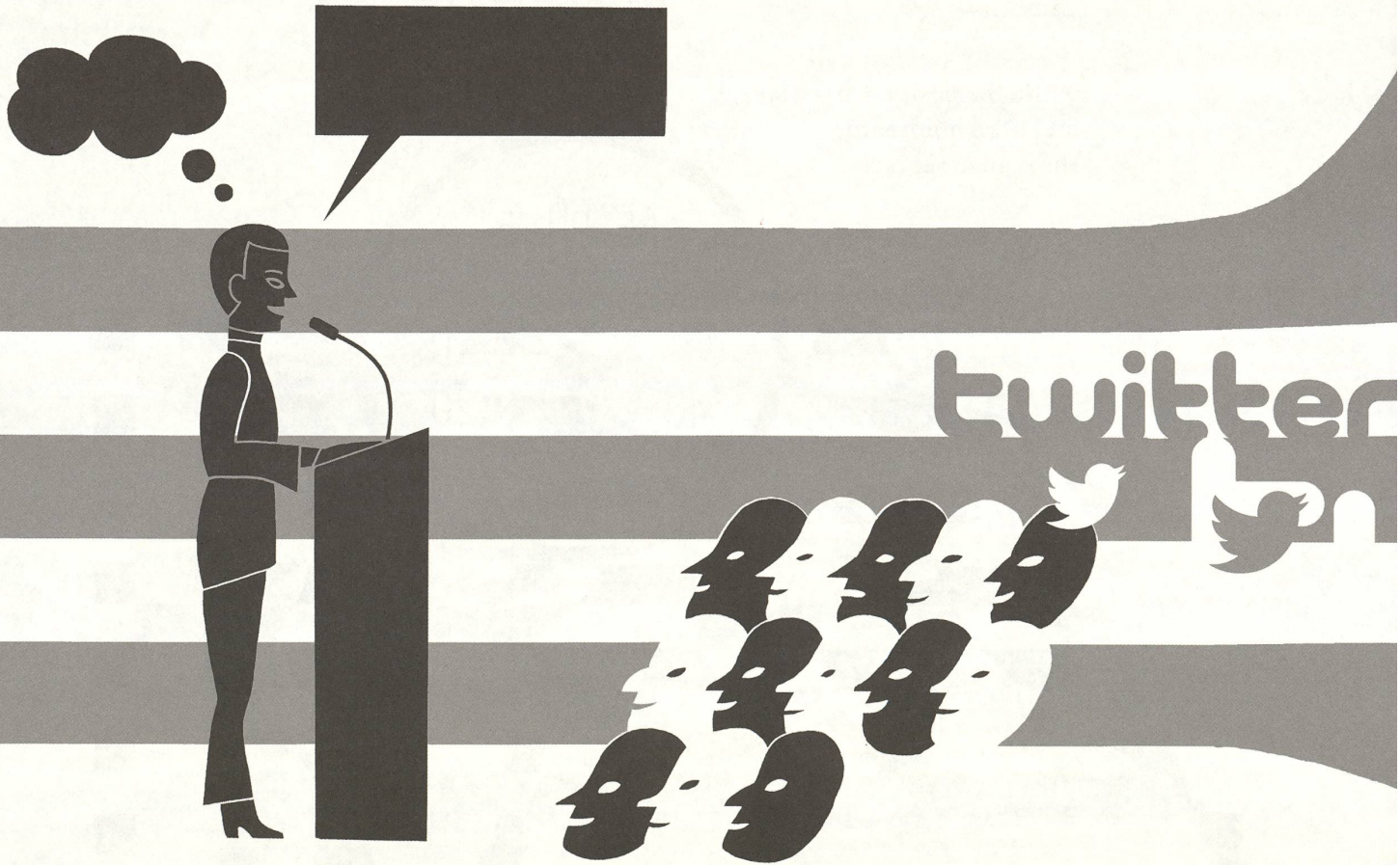
The law is called the Heisenberg Indeterminacy Principle (or you will find it under the «Uncertainty Principle», however, this term resulted from a translation mistake).<sup>2</sup> In the beginning of the 20th century, along with the movement of Art Nouveau, of cubism and of futurism in the artistic world, a colossal wave hit the scientific and the philosophical communities. It was an exciting time. The basic notions of time, causality, and space were challenged and appeared swaggering facing the giant tides of quantum physics. Questions such as «Could teleportation actually be possible?» and «Can a message be fundamentally undecipherable?» were dared to be asked again.

<sup>1</sup> Quantum physics is a branch of the physics discipline. This specialization was created with the discovery of very small-scale quantity, such as atoms and electrons. To have a large overview of the different fields in physics, you can check it out here: <http://bit.ly/12aesIt>

<sup>2</sup> In the original paper, Heisenberg used the word «Unbestimmtheit» which means «indeterminacy». Only in the endnotes did he use «Unsicherheit» meaning «uncertainty». During the translation of his work, the latter stuck.

All this was due to a very interesting propriety of a quantum particle: it is highly sensitive to observation. So sensitive that it changes as soon as it knows that it has been observed. Imagine as if it hesitates between many states, before settling down, in case someone sees it. In the quantum world, observation is equal to perturbation.

This leads indirectly to the Heisenberg Indeterminacy Principle mentioned before, where position and speed cannot both, at the same time, be known to the same accuracy.



#### THE CAMELEON HUMAN MIND

The consequences on physics theories can be found in a multitude of books. Let us rather notice the similarities it draws to human mind and opinions. It is, of course, possible to capture the essence of a society, or to summarize the opinions of one's time without perturbing it. It has been done since the beginning of times. In history, it has always been a small group of elite who had the luxury to ponder about their time, philosophy and trend – the rest of the population had to work their heads off to survive. This elite therefore observed, but did not perturb.

21st century is different not in the sense that the society is being tentatively described, but that it is aware and informed of it. There is an information flux unlike any other before, between the thinkers and the population, due to mass media and internet providing almost instantaneous transfer. If you catch it at a particular stance at a certain time, it can respond, revolt, agree, correct itself... how is it possible to predict? It makes its society's evolution speed hard to measure.

From the physics definition, speed is the derivative of position with respect to time; hence they are two inseparable notions. In quantum physics, most systems are described using both, position and speed. And while trying to describe infinitely more complex systems, such as the society or human psychology, maybe this is the solution: describe and capture its «state» by both recording its stances as well as their evolution tendencies.

*Bonnie Qian, born 1987*

Graduated from physics at ETH in 2011. Lived in Lausanne, St. Louis, Beijing and Paris. Saw with her own eyes how societies react to criticism, in different ways, in different cultures. And, at the end of the day, prefers to work with particles: it's much simpler.

Illustrations:

*Paerrick Schmidt, born 1980*

studied Visual Communication from 2002 to 2008 at the Hochschule Wismar, at the Academy of Visual Arts of Leipzig (Book Arts class) and at Berlin University of the Arts (Book Arts class). He lives today in Wismar and works under the surname of «paedie».