

Declaration for the Future
By the Physical Society of Japan and the German Physical Society
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Address Of Seiji Miyashita , President of JPS

This year marks the 100th anniversary of Heisenberg's proposal of matrix mechanics, that is, the theoretical foundation of quantum mechanics.

To celebrate this milestone UNESCO has designated this year as the "International Year of Quantum Science and Technology".

On this memorable occasion, the German Physical Society and the Physical Society of Japan are signing the Declaration for the future.

100 years ago, at the end of the nineteenth century, classical physics was largely complete as a theoretical scheme. However, there still remained several natural phenomena unexplained such as light propagation, spectrum of blackbody radiation, etc. From those anomalies, quantum mechanics and relativity, the twin pillars of modern physics, emerged.

One can say that relativity was discovered from the breakdown of classical mechanics at very large energies or velocities, while quantum mechanics emerged from its breakdown at very small scales.

Although the name of Quantum mechanics is now often heard in contexts like quantum computing, etc., its effects in daily life are less obvious. Yet, for example, the workings of the magnets that are now essential everywhere were elucidated as consequences of quantum mechanics through Heisenberg's insight known as the Heisenberg model of the exchange energy. Semiconductors are also the fruit of quantum phenomena governing the microscopic flow of electrons. Like those, physics has provided many useful items and has made comfortable lives that would seem almost magical from the perspective of the nineteenth century.

As the repertoire of knowledge developed through physics and made available to humankind continues to expand, it becomes ever more essential to exercise profound responsibility and prudence in how they are used. The same knowledge that enlightens humankind can also bring

unparalleled destruction. In particular, the two great pillars of modern physics set the stage for nuclear power, both its civil and military forms.

The most tragic reminder of this dual nature of science is the atomic bomb. We, physicists cannot turn away from the reality that our discipline made such a terror possible. Physicists, who understand their power quantitatively, must speak out that such overwhelming destructive force must never be used under any circumstances.

Our task is not only to discover the laws of nature, but also to ensure that the wisdom gained from science is used to protect humanity and our planet. We hope that the Declaration for the Future will provide a fruitful future society with physics.

Thank you very much.