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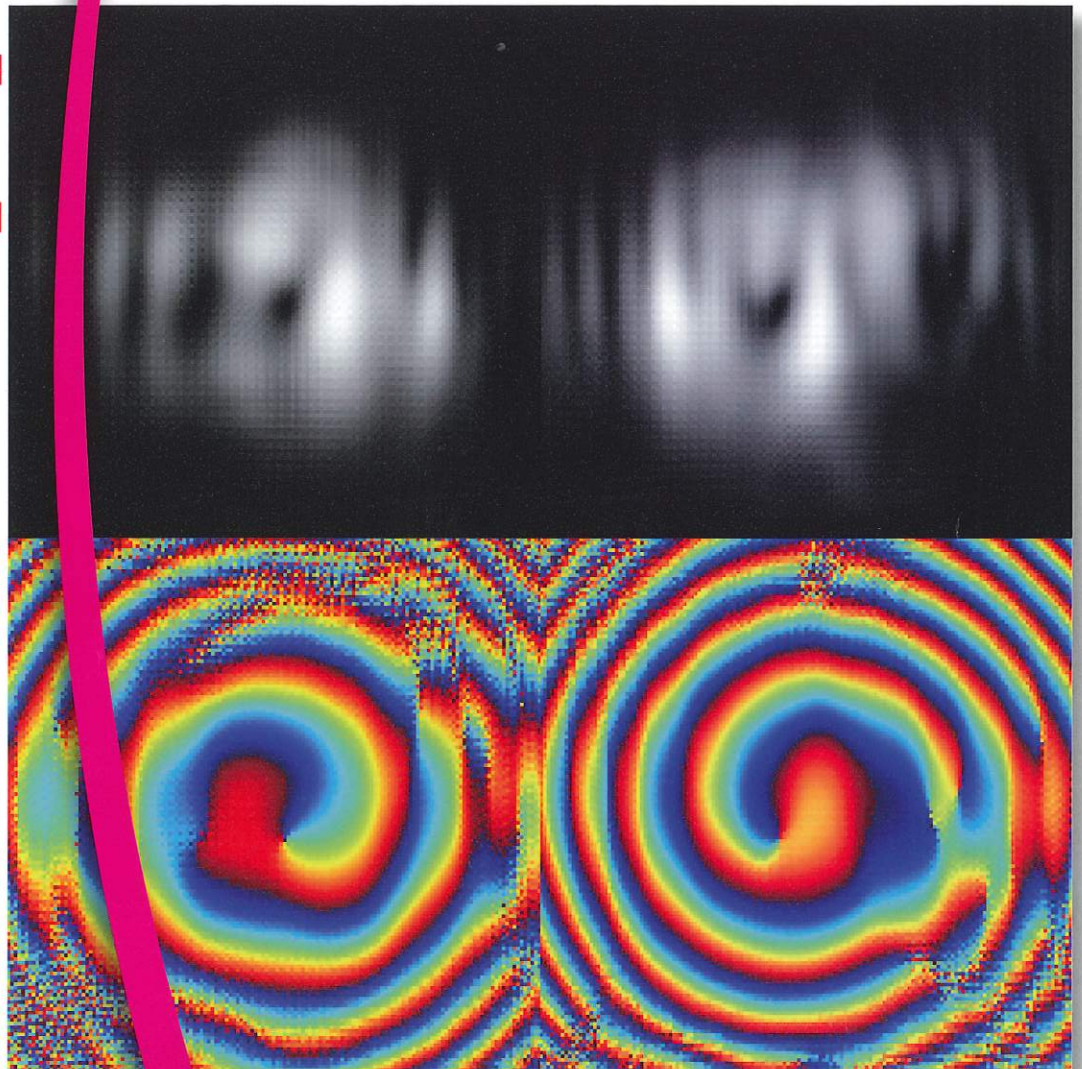
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【表紙のことば】

シリコン中の結晶転位に集束したコヒーレントX線を照射すると、ブラッグ回折波にマイクロX線渦ビームが形成される。上がX線渦の強度分布で下が位相分布。X線渦ビームは中心強度がゼロで、波面がらせん状にねじれている。右と左でらせんの向きの違いが異なっている。これは、右と左で軌道角運動量の符号が異なることに対応している。(p.366参照)

Science and Spirit in Japan

Kiyoshi KUROKAWA^{*,**}

While globalization is rapidly advancing, Japanese universities, research institutions and R&D in the private sector are losing their competitiveness and their edge for attracting global resources.

Having said that, Japanese scientific research can still be considered world class. When using the number of Nobel Prizes as an index, Japan has produced 11 winners since we entered the 21st century: four in physics, six in chemistry and one in medicine. While this is truly something wonderful, it is important to take a more critical view of the facts.

Three of them, Dr. Nanbu, Negishi and Shimomura pursued their careers in the United States. In the case of Dr. Yamanaka, while his discovery won the prize 6 years after his first paper, clearly demonstrating its great impact, given the background of his die-hard attitude towards failure as well as his selflessness, in a way, he can be considered a deviation from the "Japanese" mainstream.

These people not only have a passion for the pursuit of the truth, but their obsession makes them have a significantly stronger backbone to overcome their failures, compared to the "obsession with a title." They are the "frontier spirits" who do not care about recognition by others or society and who are not afraid of failure. While it is true that Tokyo University and Kyoto University produce a large number of smart people, I wonder if people lose their "frontier spirit" when they immerse themselves in a well-endowed environment? No wonder the only Japanese person who received the prize, graduated from Tokyo University and carried out research at Tokyo University, was Dr. Koshiba, who received the prize in the realm of natural science. And even he had a long 9-year experience studying in the United States when he was young.

Japanese scientific research has a system that is close to the Japanese "Iemoto System (a master/disciple relationship within specialized schools)" while across the world, contemporaries are continuously testing their skill against members of other schools, as "independent individuals", and being evaluated by their "peers." The role of the teacher is to make them become independent while they are still young. In other words, young people are not at the beck and call of their "professors." In particular, in England and in the United States,

teachers have been nurtured in this tradition, and this tradition has been handed over, to nurture the next generation. The spirit of "requiting of favors" through one's own experience, is what makes the new "sprouts" of the next generation bloom. This is solely because, in the United States, however short its history may be, scientists have systematized their spirits to nurture the "sprouts" of science and make them bloom. This all occurs through an "open stadium" where prodigies from all over the world can "continuously battle against members of other schools while having the independence of young researchers."

In principle, Japanese society has a "vertical" system. In any given field, one can say that horizontal movement is the exception. Although there has been some change recently, there is an "invisible hierarchy" that is shared by researchers and society, which positions Tokyo University as the summit. This leads to the number of "frontier spirits" being gradually reduced. Even when someone "studies abroad", they are sent to graduate schools and do post docs while they still belong to their original university, company or government office, and in principle, after a few years, they go back to the original place. It is not a battle against members of other schools by an "independent individual."

Japan, which opened up the country with the Meiji Restoration, experienced rapid growth while attempting to catch up and grow over the rest of the world. At the government's invitation, many scientists contributed to this new and "open Japan" and attempted to implant the spirit of science. Dr. Bälz, who built the foundation of modern medicine in Japan, gave "serious advice" at a celebration that commemorated the 25th anniversary of his moving to Japan. He said that, "In Japan, people get satisfied by just inheriting scientific results, and do not want to learn the spirit of science that brought about the results." (Bälz's diary, November 22, 1900, Iwanami Bunko.)

Even now, I don't think that the spirit of Western science has been widely accepted, and I am wondering what your take is on this? The most important responsibility and contribution we, "senior" researchers, can make is to nurture "Japanese" scientists to actively participate in the global world, which is about to experience a grand transformation.

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