

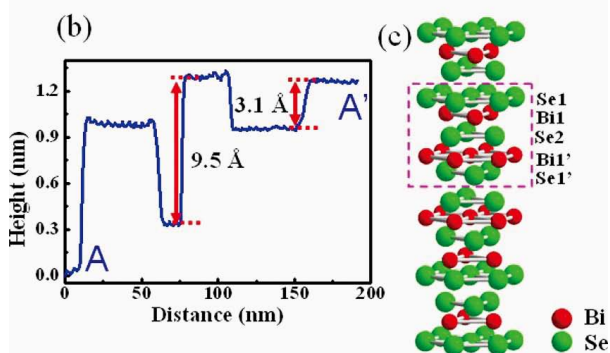
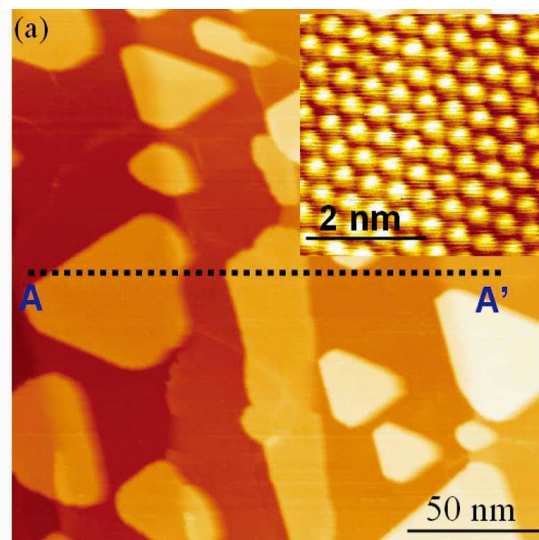


Team for Research on Topological Insulators

The team led by Prof. FANG Zhong at the CAS Institute of Physics (IOP) was awarded for their breakthrough researches in the field of topological insulators. Topological insulator is a new state of quantum matter different from conventional insulators or metals, of which human beings know very little. The team, consisting of theoretical, computational and experimental experts, has been working together extensively, and made significant and original contributions to this field.

The team discovered a new class of strong topological insulators, including Bi_2Te_3 , Bi_2Se_3 , and Sb_2Te_3 families, which are now regarded as standard topological insulating compounds. This contribution is broadly viewed as a major breakthrough in this field, and has greatly stimulated a set of new experiments worldwide. They are among the first to grow atomically flat single crystal thin films of this family compounds, which has made many high-level experiments possible. Based on their theoretical studies and high quality samples, they performed extensive experimental studies, and confirmed many of the novel characters of topological insulators, such as the standing-wave due to the Dirac type surface states, the surface Landau levels, the anti weak localization, and the oscillatory crossover from two-dimensions to three-dimensions.

In the very recent studies, they found the superconductivity in Bi_2Te_3 under pressure, which may



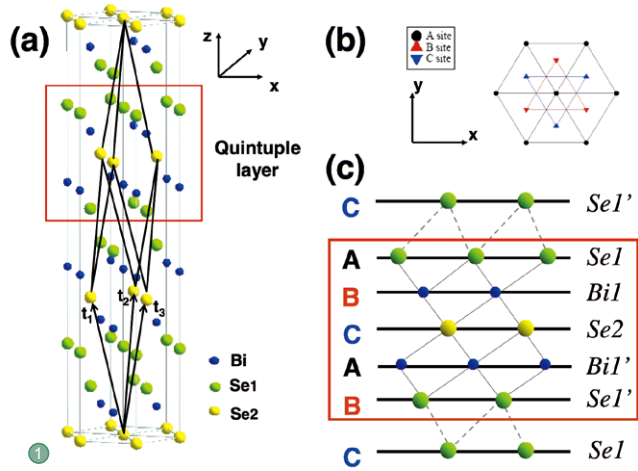
top On behalf of the team, Prof. FANG Zhong receives the prize medal from CAS President Prof. BAI Chunli.

bottom **The atomically resolved STM image of high quality Bi_2Te_3 single crystal thin film.** The team is among the first in the world to have successfully grown atomically flat single crystal thin films of this family compounds, making possible many high-level experiments.

suggest the possible topological superconducting state. They further predicted some other new states of quantum matters, such as the quantum Anomalous Hall Effect in magnetic topological insulators, and CT-invariant topological insulators. If the quantum anomalous Hall effect can be realized experimentally, it will be the first example of quantum Hall effect without external magnetic field.

All those discoveries have strongly inspired fundamental researches in physics and might herald major innovations in future semiconductor and electronic technologies.

Prof. FANG Zhong, DAI Xi and WU Kehui received the award as prominent contributors, and other 10 researchers as main participants in the work.



- ① The crystal structure of Bi_2Te_3 family compounds, a series of strong topological insulators discovered by the awarded team.
- ② The calculated Dirac type surface states. The team confirmed many novel characters inherent to topological insulators, such as the standing-wave due to the Dirac type surface states, the surface Landau levels, the anti-weak localization, and the oscillatory crossover from two-dimensions to three-dimensions.
- ③ Main members of the IOP team dedicated to the research on topological insulators.

