

**Opening Remark Delivered at a Lecture on “The Discovery of Quasi-crystals”
by Dr. Dan Shechtman, Noble Laureate, May 14th, 2102**

2011 諾貝爾化學獎得主 Dr. Dan Shechtman 演講致詞

Good Morning and a warm welcome to Tsing Hua, Dr. Shechtman, ladies and gentlemen:

We are extremely honored to have you here at NTHU for a visit and to present a lecture on the discovery of quasi-crystals. Exactly one hundred years ago, the great German physicist von Laue used the x-ray diffraction to determine the crystal structure of copper sulphate. In one stroke, x-ray was found to be a wave and crystal was deemed to be periodic! It was the beginning of modern crystallography and crystal is considered to be periodic ever since. In fact, crystal was defined to be of ordered and periodic structure. As every text book on crystallography indicated, the periodic structure can only have 1-, 2-, 3-, 4- and 6-fold rotational symmetry. That paradigm was shattered by our honorable speaker, Dr. Shechtman when he discovered the quasi-crystals on April 8, 1982. Electron diffraction from quasi-crystals has five-fold rotational axes and it is NOT periodic! As a fellow electron microscopist, it is fascinating to see the viewgraph of a photocopy from a page of the notebook kept by Dr. Shechtman with familiar words, such as BF (bright field), DF (dark field), SAD (selected area diffraction) and 36K, 50K, 100K in magnification etc. There is one line starts with SAD and ends with a question mark, “ten-fold?” The rest is history and a landmark one. One of Dr. Shechtman’s co-workers, Dr. John Cahn famous for his research on spinodal decomposition, gave a short course here on this campus on phase transformation with Prof. Turnbull of Harvard University in early 1985. With this short course, faculty members at NTHU were among the first group of scientists in the world to be exposed to the astonishing discovery. In fact, at the invitation of a

local popular magazine, Science Monthly, I wrote a short article entitled “The Discovery of Quasi-crystals; a Revolution in Crystallography” in 1986. The discovery is indeed a revolution. In quasi-crystals, the patterns are regular---they follow mathematical rules but never repeat themselves.

I believe Dr. Shechtman will tell you this morning the story of his great discovery. How it unveiled? The difficulty he had endured. How he fought a fierce battle against the established science? And, finally the ensuing triumph. One lesson that our students shall learn is that, next time when you present something new to your advisor and met with a lukewarm response, do not despair and rush to discard your idea and data---it may not be a piece of rubbish after all!

It is a great delight that this morning’s lecture will inaugurate the Months with Noble Masters on Tsing Hua campus in 2012. Although having Nobel Laureates visiting us is not a novel event, having five of them visiting, starting today, May 14th through June 19th, is truly a first!

As a forward looking research university, we cherish the experience of developing person-to-person relations with the best scholars around the world. We hope not only to learn what they have learned but more fundamentally how they conducted themselves to achieve such fruitful intellectual pursuits. The fact that we have five great scientists descending on our campus is indeed a milestone for us. However, among the five, there is an interesting fact that is worth mentioning. Three of these Nobel Laureates are from a small country such as Israel. This should have a special meaning not just for us here at NTHU but also for Taiwan in general-- if a country with only six million people can produce so many Nobel Laureates, why Taiwan, with larger population, cannot do the same? This is, indeed, a lesson we in Taiwan

can and should try to learn!