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Subject: (Embargoed) Speech by Minister Teo Chee Hean, 13 Mar 2000, 9.10 am

Singapore Government

PRESS RELEASE

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ADDRESS BY RADM TEO CHEE HEAN, MINISTER FOR EDUCATION AND SECOND MINISTER FOR DEFENCE AT THE OPENING CEREMONY OF THE INTERNATIONAL CONFERENCE ON FUNDAMENTAL SCIENCES: MATHEMATICS AND THEORETICAL PHYSICS "CHALLENGES FOR THE 21ST CENTURY" ON MONDAY 13 MARCH 2000 @ 9.10 AM AT THE SHERATON TOWERS, BALLROOMS 1 & 2

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Professor Chong Chi Tat, Deputy Vice-Chancellor, National University of Singapore,

Professor Keith Mofatt, Chairman of the International Scientific Committee of the International Conference on Fundamental Sciences,

Professor Louis Chen and Dr K.K. Phua, Co-Chairmen of the Local Organising Committee,

Ladies and Gentlemen,

1 It is a great pleasure for me to be here to open this special scientific conference.

Modern science

2 The science of each century has its own paradigm and its own heroes and icons. The 19th century is often regarded as the age of determinism. This was fuelled and propelled by the successes of Newtonian mechanics in the wake of the industrial revolution that changed the whole fabric of society in Europe. The 20th century witnessed two world wars that devastated whole countries, dislocated vast populations and brought about the eventual disintegration of colonial empires and the birth of many nations. Yet, it was in the midst of such social and political turbulence that major advances in both the fundamental and applied sciences were made.

3 Today, the search to uncover nature's deepest secrets proceeds apace. The tools available are now more sophisticated than before, and have transformed the way that research in the fundamental sciences is conducted.

4 Whether in predicting the behaviour of black holes or finding order in chaos, ever faster and more capacious computers have made it possible to conduct more in-depth and refined studies in a shorter period of time.

5 Information technology has also transformed the sociology of research. The traditional picture is of a researcher working in isolation, emerging only after long seclusion to announce a breakthrough. The Internet has made intellectual isolation virtually impossible. Ideas, information and the latest advances are readily available and accessible at any time and any place. Discussion and collaboration can now be quickly and effectively conducted over great physical distances and across different time zones. IT has opened new doors for scientific discovery, and this new century will no doubt be an even more exciting age for science and technology.

Science & Technology in Singapore

6 Since independence in 1965, Singapore has recognised the vital role of a firm foundation in science and technology for the economic development of a nation. This is especially so for a nation like Singapore which lacks natural resources. In the early days, the focus was on learning basic skills and how to

use imported technology. We relied on developing a skilled low-cost work force to capitalise on the expansion of multi-national companies. Industries blossomed in Singapore, especially in the electronics and petrochemical sectors. Higher education was systematically developed to train a competent and proficient professional workforce well schooled in the technologies that drive a modern economy.

7 More recently, we have shifted our focus to nurturing knowledge workers who will contribute in our transition into a knowledge-based economy. A greater emphasis has been placed on research and development - creating and applying new knowledge - both in the universities and in industry. The number of research staff and students at our universities has increased significantly. Research centres and research institutes have mushroomed and have contributed to industry, and established niches of excellence in the international arena.

8 Since the National Science and Technology Board was formed in 1991, gross expenditure on research and development increased from 1.00% of GDP in 1991 to 1.76% in 1998 NSTB report 1998.. In the coming decade, Singapore will continue to strive to realise our vision of developing into a knowledge-based economy and an information technology driven society. This will require a technological infrastructure built on science and engineering and an intellectual infrastructure built on advances in and interaction among the fundamental disciplines like mathematics.

Nurturing a Love for Science in Students

9 It is therefore crucial that our young develop an interest in and an understanding of science from an early age, so that more of them would be motivated to pursue a career in science and engineering.

10 It is heartening to note that the intake of science students in the National University of Singapore has increased by 21 % in the last three years, even as total student intake grew by 18%. The number of top students choosing to pursue science at university has also increased. This is the result of many developments and new initiatives in the school system and in the universities to nurture a passion for science among students.

11 In particular, I would like to commend the Faculty of Science of NUS and the Curriculum Planning and Development Division of the Ministry of Education for organising numerous programmes for our secondary and pre-

university students, including local Olympiads in Mathematics, Physics and Chemistry, the Science Research Programme, the Innovation Programme, Science Vision and the Physics Enrichment Camp.

12 Our top students have also been participating in international science events like the London International Youth Science Forum and the Research Science Institute of the Centre for Excellence in Education, USA. Such activities play an important role in creating interest in the marvels of science and encouraging students to study science at university and subsequently pursue careers in science.

Reaching out through this conference

13 I would also like to express appreciation to the scientific community for your vision and efforts in this area, and am happy to learn that this conference provides yet another opportunity for you to reach out to our students.

14 Most scientific conferences are retreats for the anointed and the initiated. I am pleased to know that this conference is unique in that its objectives go beyond that, and are geared to a three-prong drive. First, it provides the usual brain-storming sessions for specialists to review the past and the present, and to project their views for the future in anticipation of fruitful collaboration in two major areas of human knowledge: mathematics and theoretical physics.

15 Second, it publicizes and popularizes the recent developments in their fields. Third, through the lectures to schools, it reaches out to young people in the schools, firing their imagination and imparting the excitement of scientific discovery and the inspiration of creativity. I am sure that our students, teachers and even parents will benefit tremendously from this opportunity to hear world-renowned Professors unravel the mysteries of Mathematics and Theoretical Physics.

16 I trust that through your deliberations and proceedings, you will ignite the spark for further discovery and research that will help define the shape of scientific endeavour in this new millennium. I wish you a most successful and productive conference. Thank you.

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