Foreword

Welcome to Mumbai, India, the site of ADS 2011, the 2nd International Workshop on Accelerator Driven Sub-Critical Systems and Thorium Utilization. This workshop is a follow on meeting of the 1st international workshop on the same topic held during September 27-29, 2010 at Virginia Tech University, Blacksburg, USA. This workshop also includes the follow on meeting of first International Symposium on the Superconducting Science & Technology of Ingot Niobium held during September 22–24, 2010 at Jefferson Lab, Newport News, Virginia, USA.

The research and academic institutions in the world have an interest in exploitation of thorium based nuclear energy systems to enhance the sustainability, safety and proliferation resistance of nuclear power generating systems. In particular, use of thorium based fuel in the sub-critical blanket of Accelerator Driven Sub-critical system is considered to be one such promising approach for use of thorium, which itself does not have any natural fissionable isotope associated with it. Innovative physics concepts in this area have been proposed by several researchers in many countries. Several laboratories have developed capability to design and build reasonably large size Charged Particle Accelerators. These machines are based on SRF technology employing high RRR niobium cavities. Importance of ingot niobium and the latest global developments were adequately emphasized in the 2010 International Symposium on the Superconducting Science & Technology of Ingot Niobium. This ingot niobium technology is expected to usher in many industrial applications of continuous wave SRF cavities including ADS for nuclear waste transmutation, the generation of electricity from spent nuclear fuel, natural uranium or thorium, and the generation of diesel fuel from coal or natural gas.

Significant progress has been made on the design of nuclear reactors based on ADS principles. The continued development of ADS in the form of the Multi-purpose hYbrid Research Reactor for High tech Applications (MYRRHA) and ESS in Europe and significant projects in India and China show international support for using accelerators to address nuclear fuel cycle issues. India is perhaps the only country in the world that has embarked on a large program for utilization of thorium as a part of its national nuclear energy program. A Critical Facility to use thorium based fuel has already been built in India. A new advanced reactor concept, essentially Advanced Heavy Water Reactor (AHWR), has been designed for producing a major fraction of energy from thorium based fuel. Possibility of adding ADS to the AHWR for improved performance of thorium energy systems are already included in the Indian programme.

With this background, the ADS workshop series provides a great opportunity to the experts from around the world to exchange information on topics relevant to ADS and thorium utilization and form collaborations to attack common issues. Approximately 50 contributed papers mostly from Indian participants and more than 25 invited talks will be presented in this meeting.

On behalf of the members of the organizing committee of the workshop, I invite you to actively participate in the workshop and wish you a great stay in Mumbai.

Dr K.C. Mittal Convener, ADS 2011