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The Important Role of Physics in Industry and Economic Development

IGOR ALVARADO, National Instruments Corp.

Good Physics requires good education. Good education translates into good Physics professionals. The process starts early with Science, Technology, Engineering and Mathematics (STEM) education programs for Middle and High-School students. Then it continues with competitive higher education programs (2 years and 4 years) at colleges and universities designed to satisfy the needs of industry and academia. The research work conducted by graduate students in Physics (and Engineering Physics) frequently translates into new discoveries and innovations that have direct impact in society (e.g. Proton Cancer Therapy). Some of the major and largest scientific experiments in the world today are physics-centered (e.g. Large Hadron Collider-LHC) that generate employment and business opportunities for thousands of scientists, academic research groups and companies from around the world. New superconducting magnets and advanced materials that have resulted from previous research in physics are commonly used in these extreme experiments. But not all physicists will end up working at these large high-energy physics experiments, universities or National Laboratories (e.g. Fermilab); industry requires new generations of (industrial) physicists in such sectors as semiconductor, energy, space, life sciences, defense and advanced manufacturing. This work presents an industry perspective about the role of Physics in economic development and the need for a collaborative Academic-Industry approach for a more effective translational research. A series of examples will be presented with emphasis in the measurement, control, diagnostics and computing capabilities needed to translate the science (physics) into innovations and practical solutions that can benefit society as a whole.