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The Nuclear Physics of Stars

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Atomic nuclei are at the core of all the matter around us and are the fuel of stars. Nuclear reactions produce the energy in our sun that enables life on our planet and nuclear processes during the life and death of stars produce most of the chemical elements in our world. The atomic nucleus in every atom and molecule in our bodies and the world around us is a remnant of the star in which it was produced. Thus in the most literal sense we are all star dust. Many aspects of the production of the chemical elements have been solved but many mysteries remain. In this talk I will summarize what we know about the production of the elements in stars and show how nuclear physics experiments carried out at TRIUMF, Canada's national laboratory for particle and nuclear physics in Vancouver, can help to answer the open questions in this quest for understanding the origins of the chemical elements.