

In a universe not so far away...

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The quest in nuclear physics today is to reach ever farther to nuclei very far from stability in order to gain a deeper and more comprehensive description of nuclei answering questions as broad in scope as those regarding the fundamental nature of the nuclear force that binds protons and neutrons into stable or radioactive nuclei, to looking at how nuclei have shaped the cosmos. Nuclear reactions lead to the origins of the elements and it is these reactions that drive stars and stellar explosions. A key component of understanding any of the variety of nucleosynthesis processes, is reliable nuclear physics input. With the new DOE site selection for building a new facility for rare isotope beams, nuclei that have been inaccessible will be within reach. I will use the r-process or the rapid neutron capture process thought to be responsible for the creation of over 50% of the elements above Iron as an example to demonstrate impact of experimental and theoretical adventures in nuclear physics.

Eta Carinae – Massive Star Explosion to Black Hole

Artist: [Nicolle Rager Fuller/NSF](#)

