

College of Arts and Sciences  
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University of South Carolina

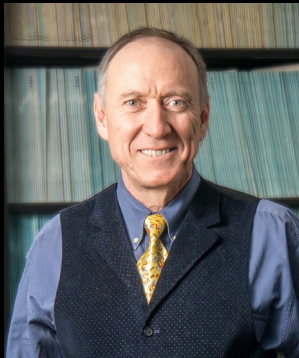
# Public Lecture

“Laying the God Particle to Rest”

Dr. Craig Roberts  
Distinguished Professor and Senior Physicist  
Argonne National Laboratory, Physics Division  
Lemont, IL



## Abstract:



The power of the sun is generated by nuclear fusion reactions; and the energy released by these reactions is simply related to the mass differences between light nuclei. Why are they so large? Indeed, more fundamentally, what is mass? Where does it come from? It is popularly thought that the 2013 Nobel Prize in physics was awarded to Englert and Higgs for answering these questions, following the discovery of the Higgs Boson in experiments using the Large

Hadron Collider (LHC), the most powerful particle accelerator on earth. However, the Higgs Boson is almost irrelevant when it comes to identifying the source of more than 98% of the visible mass in the Universe. The vast bulk of all the mass we can see and measure is found within a theory, which, on the surface, appears far simpler than that associated with the Higgs Boson. Yet, that theory, called Quantum Chromodynamics (QCD), has resisted solution for more than four decades. QCD is that part of the contemporary paradigm for unifying all the forces of Nature, which is thought to explain the structure of nuclei; namely, it is the fundamental theory of nuclear physics. This presentation will provide a simple perspective on QCD and some of those remarkable emergent phenomena within it, without which we would not exist to ask and attempt to answer those opening questions relating to the nature of mass.

# N<sub>o</sub>STAR 2017

The 11th International Workshop on the Physics of Excited Nucleons  
August 20-23, 2017

**MONDAY**

**August  
21**

**5:30 PM**

**W.W. Hootie Johnson  
Performance Hall**

**Darla Moore School of  
Business (Room #101)  
1014 Greene Street**

**Hosted By:  
Dr. Ralf Gothe**

**Free and Open to the Public**

**All Are Welcome**

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