

中部大学 理学教室

COLLOQUIUM

談話会

中部大学理学教室では、教室内外における自然科学研究教育の最前線を専門外の方にも分かりやすく紹介し、語り合える場を、企画・提供しております。今回の談話会では、三浦幸平客員教授として中部大学に滞在されている Daniel Phillips 先生にご専門の研究に関連した講演をお願いしています。参加は自由です。参加予約等も特にありません。学生の方も含め、学内・学外の多くの皆様のご参加をお待ちしております。

2006 年 4 月 中部大学理学教室

～ 第 9 回講演のご案内 ～

日時: 2006 年 4 月 26 日 (水) 16:00 ~ 17:00 中部大学 10 号館 1024 室

演題: Strong QCD and the search for a fundamental understanding of matter

講演者: オハイオ大学 物理学科 准教授
中部大学 三浦幸平 客員教授

Daniel Phillips

アブストラクト

The last 150 years has seen remarkable progress in our understanding of the sub-atomic world. Central to that progress are two of the great intellectual achievements of 20th-century science: Special Relativity and Quantum Mechanics. I will explain how these two theories are unified in the framework of quantum field theory, and then go on to show how quantum field theory provides a basis for our modern understanding of sub-atomic particles and forces. I will review the Standard Model of Particle Physics, and then argue that Quantum Chromodynamics (QCD), which describes the strong nuclear force, is in many ways the least understood part of that theory. While the atomic nucleus is, in principle, governed by QCD, it is very difficult to compute nuclear properties directly from the fundamental theory. I will explain why this is the case, and talk about recent work that uses "effective" quantum field theories to build an understanding of the nucleus that is rigorously based on QCD. I will display some recent calculations of electron- and photon-scattering from the deuterium nucleus that employ nuclear effective field theories, and argue that such reactions provide a useful testing ground for these methods. If time permits I will also discuss the application of these theoretical methods to the nuclear reactions that take place in our Sun.

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