

New Subatomic Particle Discovered

A new subatomic particle has just been discovered by the CLEO elementary particle physics experiment, a collaboration of 150 physicists from sixteen North American Universities. The collaboration, of which the Purdue Elementary Particle Physics group is a leading member, is based at Cornell University's particle accelerator the Electron Storage Ring CESR. At CESR counter rotating beams of electrons and positrons (the anti matter counterpart of the electron) collide and annihilate producing quarks, which are one of the fundamental building blocks of all matter. The collaboration has announced the discovery of a new subatomic particle dubbed the $D_{sJ}(2463)$ pronounced: "D sub sJ 2463". This particle, and another, the $D^*_{sJ}(2317)$, discovered in April by the BaBar experiment at the Stanford Linear Accelerator Center, and confirmed by CLEO in the same announcement, were completely unexpected. A proton is made of two up quarks and a down quark. The new particles, which have masses about 2.5 times the mass of a proton, are believed to consist of a quark atom in which a heavy charm quark and a lighter anti strange quark are rotating about one another held together by the strong nuclear force.

The co-Spokespersons of the CLEO Collaboration are Purdue Professor Ian Shipsey and Cornell Professor David Cassel. Other collaboration members include Purdue Professors David Miller (a former CLEO co-spokesperson) and Edward Shibata, post doctoral research associates Guangshun Huang and Victor Pavlunin, and graduate student Batbold Sanghi. Shipsey said: The discoveries can be understood in terms of Heavy Quark Effective Theory (HQET) which was developed in the early nineties to describe the behavior of quark anti-quark systems where one quark is much heavier than the other, in combination with a postulated fundamental symmetry in nature between subatomic particles containing heavy quarks called chiral or left-right symmetry. The CLEO observation provides compelling evidence that this symmetry exists, and is a further significant step in understanding and unlocking the secrets of the subatomic world. The discovery created great interest at two recent international conferences in New York and Paris and a paper describing the results has been submitted to the prestigious journal Physical Review D. A pre-publication version of the paper may be found at (<http://arxiv.org/abs/hep-ex/0305100>).