



## PHYSICS & ASTRONOMY WEEKLY CALENDAR

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### WEEKLY CALENDAR

February 25, 2008

#### Departmental Colloquium

“In search of neutrinoless double beta decay”

3:40 PM – Thursday, February 28, 2008

109 Nicholson Hall

Kai Zuber

University of Sussex

Host – Thomas Kutter

•Refreshments served at 3:15 PM in 201 Nicholson Hall•

Double beta decay is a very rare process in nature characterised by changing the ordering number  $Z$  of nuclei by two units and leaving the mass number  $A$  constant. It can basically occur in two modes, with the emission of two electrons and two anti-neutrinos or the emission of two electrons only. While the first mode is expected within the current Standard Model of particle physics, the neutrinoless double beta decay of nuclei is not allowed and is of outstanding importance for neutrino physics. It can only occur if neutrinos are their own antiparticles and if they are massive. Especially for the first property neutrinoless double beta decay is considered a gold-plated process. However, due to the known smallness of the neutrino mass, the process is very rare and its detection requires special low radioactive background environments. After a general introduction into double beta decay, the focus is on the current experimental searches and results and their implications for particle physics. An outlook towards future projects and the involved challenges is given, including a short discussion of nuclear matrix elements.

#### Materials Science and Engineering Seminar

"Massively Parallel Simulations of High-Temperature Superconductors"

3:40 pm – Wednesday, February 27, 2008

109 Nicholson Hall

Mark Jarrell

University of Cincinnati

Host: John DiTusa

#### Congratulations to:

Gabriela Gonzalez, who has been elected secretary/treasurer of the American Physical Society's Topical Group on Gravity (<http://www.ligo-wa.caltech.edu/~ggr/>).

#### Publications:

"Orbital dynamics of binary boson star systems," C. Palenzuela, L. Lehner, and S. L. Liebling. Phys. Rev. D 77, 044036 (2008).

"Coherent communication with linear optics," Mark M. Wilde, Todd A. Brun, Jonathan P. Dowling and Hwang Lee, Phys. Rev. A 77, 022321 (2008).